Case Assignment and the Complement/Adjunct Dichotomy

A Non-Configurational Constraint-Based Approach

von

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Philosophische Dissertation

angenommen von der Neuphilologischen Fakultät

der Universität Tübingen

am 29. November 1999

Tübingen

1999

Gedruckt mit Genehmigung der Neuphilologischen Fakultät
der Universität Tübingen

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Mitberichterstatter: Prof. Dr. Marek Świdziński
Dekan: Prof. Dr. Bernd Engler

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Acknowledgements

It is my sincere pleasure to acknowledge the help of many people in the process of preparing this thesis.

First of all, I would like to thank my supervisors, Prof. Erhard Hinrichs of the Universität Tübingen and Prof. Marek Świdziński of the University of Warsaw, not only for their comments and criticism, which led to improvements in various places of this study, but also for their moral support, especially at the final stages of this enterprise.

I have also greatly benefitted from comments from and/or discussions with the following people: Bob Borsley, Tilman Höhle, Detmar Meurers, Carl Pollard, Frank Richter, Ivan Sag and Manfred Sailer, as well as Mike Calcagno, Stefan Dyła, Katarzyna Dziwirek, Anna Kupść, Małgorzata Marciniak, Stefan Müller, Agnieszka Mykowiecka, Karel Oliva, Gerald Penn and Sasha Rosen. When in Tübingen, I especially enjoyed horizon-broadening conversations with Manfred and Frank, as well as with my office-mates, Jörg Stotz and Roland Meyer.

Various people have generously provided their grammaticality judgements on Polish utterances. My greatest gratitude goes to my wife, Danusia, who not only has suffered through more acceptability judgements than I would wish my worst enemy, but also has had to put up with me sometimes focusing on the syntax of her utterances more than on the semantics. Other people whose patience I have severely tested are: my Mum, Anna Kupść, Agnieszka Mykowiecka, Małgorzata Marciniak, Ela Hajnicz, Krzysztof Czuba and Marek Świdziński. Occasional grammaticality judgements on English sentences have also been provided by Bob Borsley, Paul King, Tom Cornell, Mike Calcagno, Gerald Penn, Graham Katz, Carl Pollard and Sue Brown.

Many people have also helped me to find various works relevant to this study. Particular thanks go to: Andrzej Bogusławski, Bob Borsley, Liz Bratt, Sue Brown, Andrew Kehler, Soowon Kim, Tracy Holloway King, Roland Meyer, Carl Pollard, Frank Richter, Manfred Sailer, Marek Świdziński and Gregory Ward.

I owe very special thanks to Bob Borsley, who has proof-read parts of this study at a very short notice, and to Paweł Karnowski, who has provided very generous logistical help.

I would also like to thank Prof. Leonard Bolc and the members of his Language Engineering group (Ela Hajnicz, Małgorzata Marciniak, Agnieszka Mykowiecka and Piotr “Szopen” Rychlik) at the Institute of Computer Science, Polish Academy of Sciences, for providing me with excellent working conditions and enjoyable atmosphere in which I could complete the work presented here.

My sincere gratitude goes also to the staff members and students of the Centre for Cognitive Science, University of Edinburgh, where I spent the academic year 1993/94, and especially to Elisabet Engdahl, the then Head of the Department. If I got that far, it is to a large extent thanks to the batteries loaded then and there. CogSci vintage 1993/94, with its international, enthusiastically scientific but unpretentious atmosphere, will always remain for me a benchmark against which to compare other departments.

Finally, last but not least, my heartfelt thanks go to my wife, Danusia, whom I dedicate this study: living with someone writing a doctoral thesis may be as trying as writing it oneself!

Prologue

Chapter 1

Introduction

1.1 Scope

Ever since the advent of modern linguistics in the 1950's, propelled by early works of an MIT linguist, Noam Chomsky (especially, Chomsky (1957) and Chomsky (1959)), syntactic trees have played an important rôle in linguistic explanation. Different behaviour of different syntactic entities has often been explained by their differing tree-configurational positions.

The most general aim of this study is to show that the rôle of tree-configurationality is much less important than often assumed, and that various phenomena should rather be analysed with the help of other linguistic mechanisms. In particular, this study deals with two areas of syntax in which tree-configurationality is supposed to be directly manifested, namely, syntactic case assignment and the complement/adjunct dichotomy.

In both areas, we present formal syntactic accounts of the relevant phenomena which do not rely on tree-configurationality. In fact, we argue that, in both cases, configurationality-based analyses are at best unmotivated, and at worst empirically wrong and untenable.

The main empirical basis of this study is Polish, a West Slavic language with a number of interesting case and valency phenomena. Thus, most of the empirical results obtained below will be of particular relevance to Slavic linguistics. However, when developing the general approaches to case assignment and to the complement/adjunct dichotomy, we will briefly look at phenomena from other languages, as different as English, German, Korean and Finnish, and attempt to obtain a cross-linguistically valid theory.

In the remainder of this Chapter, we explicate our methodological assumptions (§1.2), explain the basic terminology and abbreviations (§1.3), and outline the organization and the main results of this study (§1.4).

1.2 Method

1.2.1 Generative Linguistics

This study is firmly set within the generative linguistics tradition. Since the term *generative* is often used in a very restricted sense, referring to whatever is the current theory advocated by Noam Chomsky and his colleagues, we feel obliged to cite the relevant dictionary entries here (*emphasis* ours):

> **generative grammar** n. 1. A grammar for a particular language which at least enumerates and usually also *characterizes (assigns structures to) all and only the well-formed sentences* of that language... Such a grammar differs from other approaches to grammatical description in that it is *fully explicit*, leaving nothing to be filled in by a human reader. The notion of a generative grammar in this sense was introduced by Chomsky (1957)... 2. Any particular theory of grammar which has as its goal the construction of such grammars for particular languages. 3. The enterprise of constructing such theories of grammar...
>
> (Trask, 1993, p.117)

> [A] **generative grammar** is a set of *formal rules* which projects a finite set of sentences upon the potentially infinite set of sentences that constitute the language as a whole, and it does this in an *explicit manner*, *assigning to each a set of structural descriptions*... In recent years, the term has come to be applied to theories of several different kinds, apart from those developed by Chomsky, such as Arc-Pair Grammar, Lexical Functional Grammar and Generalized Phrase-Structure Grammar...
>
> (Crystal, 1997, pp.166f.)

Thus, the main objective of a generative linguist is to develop a formal and explicit theory that can predict which sentences of a language are grammatical, and assign them linguistically sound structures.

Of course, developing a complete theory of a given language is a formidable task, so linguists must be content with developing theories of *parts* of a language, usually concentrating on specific phenomena. This is exactly what we will do here, with the relevant linguistic areas of interest being case assignment and the complement/adjunct dichotomy.

1.2.2 Descriptive Adequacy

There is a well-known hierarchy of generative grammars, also dating back to Chomsky's oeuvre. A grammar of a language is *observationally adequate* if it correctly decides which sentences belong to the language, i.e., which are grammatical and which are not. A grammar is *descriptively adequate* if it accurately reflects native speakers' knowledge of the language; such a grammar must in particular reflect all valid generalizations about the language. Finally, a grammar is said to be *explanatorily adequate* if it is psycholinguistically valid, in particular, if it reflects the acquisition of language.

Now, it is a truism that developing an explanatorily adequate grammar of a language is an aim much more important and exciting than developing a grammar that is merely observationally or even descriptively adequate. Accordingly, much of present-day linguistics is involved in a quest for explanatorily adequate theories of language. The consequence of this is that developing a grammar which is simply descriptively adequate is sometimes regarded to be a menial task, unworthy of a modern linguist.

However, the view implicit throughout this study is that, important advances in psycholinguistics notwithstanding, our present-day knowledge of matters such as acquisition of syntax and innate linguistically-related properties of human brains is so sparse that any attempt at developing such an explanatorily adequate theory must be highly stipulative in nature (a pure guess-work, in fact).[1]

There is a related important problem concerning the search for an explanatorily adequate grammar: linguists seem to often forget that the prerequisite for such a successful grammar or theory of language is that it also be descriptively (and, of course, observationally) adequate. What use is there of a computer program which is fast and equipped with a sparkling Graphical User Interface if it does not do the job it is supposed to do? What use is there of a proof of a theorem which is elegant and brief, but contains non-sequiturs? Similarly, grammars or theories of grammar which are claimed to be psycholinguistically valid or aesthetically elegant are worthless if they do not reflect empirical linguistic facts. This is a truism which is ignored surprisingly often.

In this study, we will take a more realistic, but still very difficult tack and attempt to develop theories which are descriptively adequate. In consequence, we will avoid sweeping uncomfortable facts under the rug only because they ruin the elegance of the theory. This, together with the explicitness and formality aimed at in this study, means that, for example, we will not be satisfied with 'principles' such as (1.1), however elegant they seem and however common is the linguistic practice of proposing 'principles' at this level of vagueness (even if sprinkled with some technical notions).

(1.1) Assign accusative whenever possible.

Instead, we will adopt a formalism which allows stating generalizations in a precise and explicit manner, even if this occasionally means giving up elegance. In other words, this is a linguistic study, with linguistics treated as Science and not as Art.

1.2.3 Eclecticism

The analyses obtained in this study are cast within Head-driven Phrase Structure Grammar (Pollard and Sag, 1994), a formalism which, both, has sound logical foundations and is a fully fledged linguistic theory.

Head-driven Phrase Structure Grammar (HPSG), which will be briefly described in §2.1, is an eclectic theory of language, borrowing freely from Generalized Phrase Structure Grammar

[1]A very readable overview of the current state of psycholinguistics, which licenses this view, can be found in Altmann (1997).

(GPSG), Government and Binding theory (GB), Lexical-Functional Grammar (LFG), Categorial Grammar (CG), and from other linguistic formalisms. In this study, we will maintain this eclectic tradition and develop our approach in relation not only to previous HPSG work, but also to Chomskyan linguistics (GB, Minimalism) and to Lexical-Functional Grammar, as well as, occasionally, other linguistic theories. This distinguishes this study from, say, most work within GB or the Minimalist Program (MP), in which cross-theoretical citations are very rare.

This does not mean, of course, that we intend to spurn work done within other traditions; there is simply so much literature even within one theory, that choices must be made. We decided to concentrate on theories which are historically close to HPSG and which, at the same time, have something to say about topics central to this study, such as case assignment in Slavic and the complement/adjunct distinction. Among the approaches that, to our regret, had to be by-and-large ignored here, solely because of the time and space constraints, are various dialects of Dependency Grammars (Mel'čuk's Meaning-Text Model, Functional Generative Description of Hajičová, Panevová and Sgall, Hudson's Word Grammar), Categorial Grammar, and Relational Grammar.

1.2.4 Conservatism and Modularity

A final methodological point we want to make concerns the importance of being conservative and developing analyses which are modular.

It is usually assumed, and we adopt this assumption here, that language is a complex system and that, ideally, in order to fully describe one phenomenon in all its interactions, one should describe not less than the whole language. Of course, at the present stage of linguistic knowledge this is impossible, so the next best strategy is to describe the given phenomenon (or phenomena) on its (or their) own, but having in mind existing analyses of other phenomena and constantly checking for compatibility of these different analyses. This is what we will try to do in this study; in fact, some of the motivation for our approach to case assignment developed in Part I comes from the considerations of compatibility of case assignment with other modules of the grammar.

Theoretical linguistics as we know it today is a relatively young science and changes often have a revolutionary, rather than evolutionary character. Unfortunately, this often hampers the development of the field, as linguists must be preoccupied with re-formulating old analyses within new sets of assumptions, instead of building on previous work and developing better analyses of more advanced phenomena.[2]

In this study we attempt to be as conservative as possible. This means that we will often put more effort into modifying and improving existing intuitions and analyses, than into building new analyses from scratch, without any regard to already existing (even if flawed) accounts. The disadvantage of this approach is that the results will sometimes look less than spectacular, but the advantage is that they will, we hope, advance the science instead of simply reformulating it.

[2]An especially drastic example is the recent replacement of Government and Binding theory (Chomsky, 1981, 1986a,b), with a host of often interesting and detailed analyses of various phenomena, by so-called Minimalist Program (Chomsky, 1995c), much vaguer and largely programmatory in character.

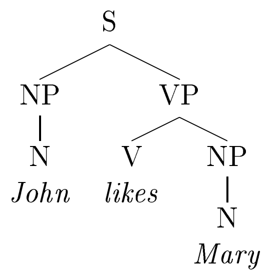
1.3 Terminology and Abbreviations

Overall, we assume the terminology common in generative linguistics, especially, in HPSG. Some of it will be made precise at the beginning of relevant Parts (e.g., *case* at the beginning of Part I, *adjunct* at the beginning of Part II). Here, we will just briefly explain some important or potentially confusing terms.[3]

1.3.1 Configurationality

The notions *configurational* and *non-configurational* will occur in this study especially often. Relatively pretheoretically, *configurationality* pertains to positions within syntactic trees. For example, assuming the simplistic syntactic tree (1.2b) for the sentence (1.2a), relations such as 'a daughter of the VP', 'the sister of the NP *John*' or 'the mother of the verb *likes*' are all tree-configurational relations.

(1.2) a. John likes Mary.

b. 

Within particular theories, the situation is most clear in LFG: here, the term *configurational* pertains to the *c-structure*. On the other hand, the *f-structure* is a non-configuration level of representation.

In Principles and Parameters (P&P), the usual syntactic trees constitute the configurational part of the representation, with, e.g., θ-roles and features being non-configurational bits of relevant representations (although, of course, they are present on particular configurational tree nodes).

Finally, within HPSG, we will call *configurational* whatever pertains to values of the DTRS attribute. By contrast, values of SYNSEM represent non-configurational information.[4]

In this study, we will call those analyses or approaches *configurational*, which rely on (or refer to) such configurational levels of representations.

1.3.2 *Adverb*, *Ad-verbal* and *Adverbial*

By *dependents* of a head, we mean both arguments and adjuncts combining with this head. *Arguments* can be further partitioned into *subject* and *complements*,[5] and perhaps also a

[3] See also §2.1.4 on the notion *lexical* as used in this study.
[4] See §2.1 below for a brief characterization of HPSG.
[5] Note that *complements* are not restricted to controlled arguments, as they are in LFG parlance.

specifier, in case of nominal heads. Adjuncts combining with verbal heads will also be called *adverbials*. Moreover, we will use the notions *adjunct* and *modifier* interchangeably, although we will try to avoid the latter term as its meaning varies considerably in different traditions.

Adverbials should be carefully distinguished from *adverbs*, which are simply lexical items belonging to a certain morphosyntactic category, just like verbs, nouns, prepositions and adjectives. This means that there may be complements headed by adverbs (e.g., *badly* in *He behaved badly*), and adverbials not headed by adverbs (e.g., *two hours* in *She waited two hours*).

Since we will sometimes talk about dependents of particular morphosyntactic classes of heads (e.g., of verbs or nouns), we also need terms such as *ad-verbal*, *ad-nominal* and *ad-prepositional*. Thus, for example, adverbials can be defined as ad-verbal adjuncts. Much confusion in linguistic literature results from not distinguishing the notions behind the terms *adverbial*, *ad-verbal* and *adverb*.[6]

In summary:

- *ad-verbal*, *ad-nominal*, etc. = combining (or occurring) with *verbs*, *nouns*, etc. (respectively);
- *dependents* = *arguments* + *adjuncts*;
- *arguments* = *subjects* (+ *specifiers*) + *complements*;
- an *adverbial* = an *ad-verbal adjunct*;
- an *adverb* = an element of a morphosyntactic category opposed to the categories *verb*, *noun*, *adjective*, etc.

1.3.3 Abbreviations

Below, we list the abbreviations used in this study.

Cases:

nom	nominative
acc	accusative
dat	dative
gen	genitive
ins	instrumental
loc	locative
voc	vocative
ill	illative

Numbers:

[6] In this study, we will be concerned mainly with ad-verbal dependents, and only to a much lesser extent with ad-nominal and ad-prepositional complements and adjuncts.

sg	singular
pl	plural

Persons:

1st	first person
2nd	second person
3rd	third person

Genders:

masc	masculine
fem	feminine
neut	neuter

Tenses:

fut	future
pres	present
pst	past

Other morphosyntactic categories:

poss	possessive
adj	adjective
adv	adverb
grnd	gerund
inf	infinitival
fin	finite
impers	impersonal
-no/-to	*-no/-to* impersonal
pass	passive
passp	passive participle
pstp	past participle (*l*-participle)
advp	adverbial participle
adjp	adjectival participle
subj	subjunctive
ind	indicative
cl	clitic

Functional words, etc.:

NM	negative marker
RM	reflexive marker
Aux	auxiliary

Dist	distributive element
Q	question particle
Cond	conditional particle
Self	anaphoric pronoun
Emph	emphatic element
Expl	expletive element

Theories:

GB	Government and Binding
MP	Minimalist Program
P&P	Principles and Parameters (= GB + MP)
RG	Relational Grammar
CG	Categorial Grammar
LFG	Lexical-Functional Grammar
GPSG	Generalized Phrase Structure Grammar
HPSG	Head-driven Phrase Structure Grammar
SRL	Speciate Re-entrant Logic
RSRL	Relational Speciate Re-entrant Logic
DCG	Definite Clause Grammar

Theoretical Constructs:

GoN	Genitive of Negation
LD GoN	Long Distance Genitive of Negation
NC	Negative Concord
CC	Clitic Climbing
VPE	Verb Phrase Ellipsis
LF	Logical Form (in GB)
ECP	Empty Category Principle (in GB)
CED	Condition on Extraction Domains (in GB)
ID	Immediate Dominance
LP	Linear Precedence
LR	Lexical Rule
DLR	Description-level Lexical Rule (in HPSG)
MLR	Meta-level Lexical Rule (in HPSG)
AELR	Adjunct Extraction Lexical Rule (HPSG)
CELR	Complement Extraction Lexical Rule (HPSG)
NP	Noun Phrase
VP	Verb Phrase
PP	Preposition Phrase
AP	Adjective Phrase
AdvP	Adverb Phrase
XP, YP	any phrase

1.4 Organization and Overview of Results

This study is divided into two main Parts, which are to some extent independent:[7] Part I, on case assignment, and Part II, on the complement/adjunct dichotomy.

Part I consists of three Chapters. Chapter 3 summarizes the main features of previous approaches to case assignment, concentrating on accounts within generative linguistics, especially, within GB, LFG and HPSG. Chapter 4 presents a fully non-configurational analysis of syntactic case assignment; although such an analysis is often assumed in LFG, and has been alluded to in HPSG, it has never (to the best of our knowledge) been explicitly and formally developed in generative linguistics. Finally, in Chapter 5, we apply this analysis to a number of interesting case phenomena in Polish. In particular, we give various criteria for distinguishing two kinds of case assignment, namely, inherent/lexical and structural (§5.1), we develop a formal account of so-called Genitive of Negation, concentrating on issues usually neglected in the literature (§5.2), we deal with complex case patterns within various types of numeral phrases (§5.3), and we present an analysis of case assignment to predicative phrases (§5.4). Although all these phenomena have been dealt with in generative literature, our account considerably extends the empirical coverage of those analyses, and at the same time shows that a successful analysis does not have to rely on configurationality of case assignment (in fact, resulting analyses are often simpler and more elegant when no such configurationality is assumed).

Part II is, admittedly, more eclectic than Part I. Chapter 6 summarizes previous approaches to the complement/adjunct distinction, especially those within generative linguistics (GB, LFG, HPSG). The results of the next two Chapters, 7 and 8, are mainly negative: they purport to show that various arguments for a configurational construal of the complement/adjunct dichotomy do not stand scrutiny. In particular, Chapter 7 shows that probably the most famous argument for such a tree-configurational distinction, based on the behaviour of the 'proform' *do so* in English, cannot tell us anything about syntactic positions of complements and adjuncts simply because, as we show in painful detail, *do so* is a clear case of a pragmatic anaphor, referring to conceptual objects rather than pieces of syntax. Similarly, Chapter 8 examines various phenomena in Polish whose analyses often rely on configurational complement/adjunct distinction and shows that neither of these phenomena correlates with any intuitive understanding of the dichotomy at hand. Although these seem to be *solely* negative results, there is a positive side to them: in the process of refuting current analyses of these phenomena, we attempt to develop more valid intuitions and generalizations, which may eventually lead to more robust accounts.

Chapter 9, on the other hand, is purely analytical: it reviews various non-configurational approaches to the complement/adjunct dichotomy existing in HPSG, adopts one of them and develops it in formal detail. Perhaps the most important result of this Chapter is its by-product: an HPSG analysis of quantification which substantially improves on other such accounts. Then, in Chapter 10, the last Chapter of Part II, we present additional cross-linguistic arguments for the non-configurational approach to the complement/adjunct dichotomy, all based

[7]In general, some effort has been put into making particular Chapters accessible on their own, without the need to read previous Chapters. Where this is not fully possible, as in case of Chapter 5, which relies on the results of Chapter 4, the main points should be understandable (even to a reader with only cursory knowledge of HPSG) from the text surrounding the technical bits.

on syntactic case assignment, and then extend to adjuncts (and slightly revise) the analysis of case assignment in Polish reached in Chapter 5.

Finally, various parts of the account developed in this study are collected and fully formalized in the Appendix A.

Before we move to the main body of this thesis, however, some background information about HPSG and about Polish is in order.

Chapter 2

Background

2.1 HPSG

The aim of this section is to make this study more accessible to readers without any knowledge of Head-driven Phrase Structure Grammar. It attempts to briefly explain the most basic assumptions and mechanisms of HPSG.

However, this is *not* an introduction to HPSG, for at least two reasons. First, what we say here is not always precise or even strictly true: we find it simply impossible to introduce HPSG in a precise manner in a couple of pages. Second, due to space limitations, we concentrate here only on some (most basic) aspects of HPSG. Important parts of the HPSG theory which we will ignore in this introduction include:

- word order (see, especially, Reape (1992, 1994), Kathol (1995, 1999), and also Penn (1999));
- extraction (see Bouma *et al.* (1999b) and references therein);
- semantics (see Pollard and Sag (1994, ch.8), Pollard and Yoo (1998) and Kasper (1997), as well as Richter and Sailer (1997, 1999b) and Copestake *et al.* (1997) for other approaches);
- phonology (see Klein (1993), Bird and Klein (1993, 1994), Bird (1995), and Höhle (1999) for a different approach).

Unfortunately, at the time of writing this study, no general introduction to HPSG is available. The original introduction to HPSG, i.e., Pollard and Sag (1987), is now severely out-of-date. The standard HPSG reference is Pollard and Sag (1994), which, however, is not really an introductory text. Finally, Sag and Wasow (1999) is an introduction to syntax based on HPSG-like mechanisms and assumptions, but not itself an introduction to HPSG.

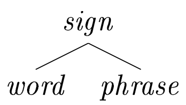
2.1.1 Basics

HPSG is a full-fledged generative linguistic formalism with sound logical foundations.[1] It is a successor to GPSG (Gazdar *et al.*, 1985), influenced by other linguistic theories, especially, LFG, GB and CG. Unlike GB and MP, though, HPSG is a monostratal (non-derivational) theory of language.

HPSG grammars consist of a *type hierarchy* ('signature') and a set of *constraints* ('theory'); hence, HPSG belongs to the family of constraint-based formalisms. The type hierarchy defines potential linguistic objects, while constraints decide which of these potential linguistic objects are actual linguistic objects. Moreover, the type hierarchy specifies which *features* may be borne by objects of which types.

To take a concrete example, consider the type hierarchy below, a part of a larger type hierarchy.

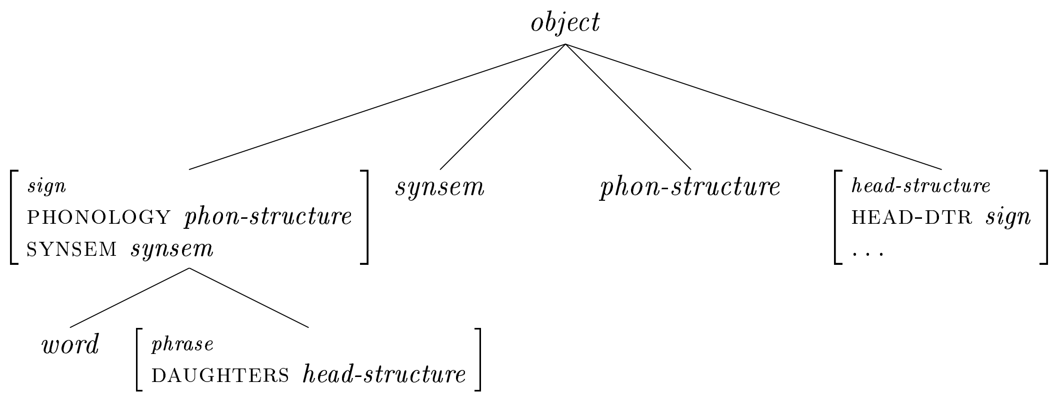
(2.1)



This simple type hierarchy says that there are (or rather, may be) linguistic objects of type *sign*, and each such object must also be of type *phrase* or type *word*, but not both of them at the same time. In other words, (2.1) says that objects of type *sign* are partitioned into *word* and *phrase*.

Moving now to features, a little more realistic type hierarchy, together with some feature specifications, is given in (2.2).

(2.2)



What this (still very partial) type hierarchy says is that each *object* is either a *sign*, a *synsem*, a *phon-structure* or a *head-structure*, with each *sign* being either a *word* or a *phrase*. However, in addition, it says that each object of type *sign* (hence, each *word* and each *phrase*) has two features, namely, PHONOLOGY, whose value is an object of type *phon-structure*, and SYNSEM, whose value is of type *synsem*. Moreover, *phrase*s (but not *word*s) additionally have the feature

[1] See Appendix A on logical foundations of HPSG.

DAUGHTERS, whose value, of type *head-structure*, represents the configurational information. And finally, objects of type *head-structure* have the *sign*-valued feature HEAD-DTR, and some other features, which we will ignore for a moment.[2]

Of course, the intuition behind this type hierarchy is that the main type of linguistic objects, i.e., *signs*, have as their components some phonological structure (the value of PHONOLOGY), and some syntactico-semantic specification (the value of SYNSEM), that both *words* and *phrases* are such Saussurian *signs*, and that the main difference between *words* and *phrases* is that the latter, but not the former, have a constituent structure (the value of DAUGHTERS).

Such type hierarchies, as they get larger, quickly become unwieldy, so it is a common HPSG practice to display them in a piecemeal fashion (e.g., just the subhierarchy for *sign*, as in (2.1)) and to use abbreviations (e.g., PHON for PHONOLOGY, DTRS for DAUGHTERS, etc.). A list of most common such abbreviations can be found in §2.1.5 below.

We still have not said anything about constraints. Intuitively, they are rules or specifications that all objects must obey. In order to explain them, we must first extend the type hierarchy (2.2). Let us first look closer at objects of type *synsem*, a type that will occur very often in this study.

There are two features appropriate to *synsem*, namely, LOCAL, with values of type *local*,[3] and NONLOCAL with values of type *nonlocal*. We will ignore *nonlocal* objects for the time being. As far as *local* objects are concerned, they have three features: CATEGORY with values of type *category*, CONTENT with *content* values and CONTEXT with *context* values. CONTENT and CONTEXT represent, roughly, the semantic and pragmatic information of a given *sign*. CATEGORY, on the other hand, represents the (morpho-)syntactic information, with the exception of constituent structure (which is represented by DTRS), and has three features, namely, HEAD (the value is of type *head*), VALENCE and ARG-ST (we will deal with values of the last two in a short while). In summary, each object of type *synsem* has the following basic structure:

$$\text{(2.3)} \quad \begin{bmatrix} \textit{synsem} & \\ \text{LOCAL} & \begin{bmatrix} \textit{local} & \\ \text{CATEGORY} & \begin{bmatrix} \textit{category} \\ \text{HEAD } \textit{head} \\ \text{VALENCE } \ldots \\ \text{ARG-ST } \ldots \end{bmatrix} \\ \text{CONTENT} & \textit{content} \\ \text{CONTEXT} & \textit{context} \end{bmatrix} \\ \text{NONLOCAL} & \textit{nonlocal} \end{bmatrix}$$

Of course, the types *local*, *nonlocal*, *category*, etc., must be explicitly added to the type hierarchy (2.2); they all happen to be immediate subtypes of the type *object*.

Now, we are in the position to state the most famous HPSG constraint, i.e., the HEAD FEATURE PRINCIPLE (a slightly simplified version):

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[2]'...' is not part of the official notation; it is just our informal means of saying that there may be more features appropriate to *head-structure*.

[3]Having the same names for a feature and for the type of its value is slightly confusing. However, typographical conventions (CAPITAL LETTERS for a feature names, *italic* shape for type names) should make it a little less confusing.

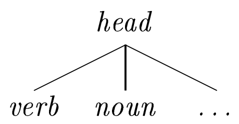
(2.4) HEAD FEATURE PRINCIPLE:

$$\textit{phrase} \rightarrow \begin{bmatrix} \textsc{synsem}|\textsc{local}|\textsc{category}|\textsc{head}\ \boxed{1} \\ \textsc{dtrs}|\textsc{head-dtr}|\textsc{synsem}|\textsc{local}|\textsc{category}|\textsc{head}\ \boxed{1} \end{bmatrix}$$

What this constraint says is that, for each linguistic object, if that object can be described by the left hand side of '→', then it can be described by the right hand side of '→'. More specifically, for each object, if that object is of type *phrase*, then the value of its SYNSEM... HEAD must be equal to the value of its DTRS... HEAD. This is what the double occurrence of the tag (or variable) $\boxed{1}$ means: whatever is the value of SYNSEM... HEAD must also be the value of DTRS... HEAD.[4] In other words, the morphosyntactic features (i.e., the HEAD value) of the mother in a syntactic tree must be identical to the morphosyntactic features of the head daughter.

This is where it becomes clear that constrains limit the space of possibilities given by type hierarchies. Assuming that *head* has subtypes such as *verb*, *noun*, etc. (see (2.5) below), the type hierarchy so far allows, e.g., *phrase*s such as (2.6).

(2.5)



(2.6)

$$\begin{bmatrix} \textit{phrase} & \\ \textsc{phon}\ \ldots & \\ \textsc{synsem} & \begin{bmatrix} \textit{synsem} & \\ \textsc{local} & \begin{bmatrix} \textit{local} & \\ \textsc{category} & \begin{bmatrix} \textit{category} \\ \textsc{head}\ \textit{verb} \\ \textsc{valence}\ \ldots \\ \textsc{arg-st}\ \ldots \end{bmatrix} \\ \textsc{content}\ \textit{content} & \\ \textsc{context}\ \textit{context} & \end{bmatrix} \\ \textsc{nonlocal}\ \textit{nonlocal} & \end{bmatrix} \\ \textsc{dtrs} & \begin{bmatrix} \textit{head-structure} & \\ \textsc{head-dtr} & \begin{bmatrix} \textit{sign} \\ \textsc{synsem}|\textsc{local}|\textsc{category}|\textsc{head}\ \textit{noun} \end{bmatrix} \\ \ldots & \end{bmatrix} \end{bmatrix}$$

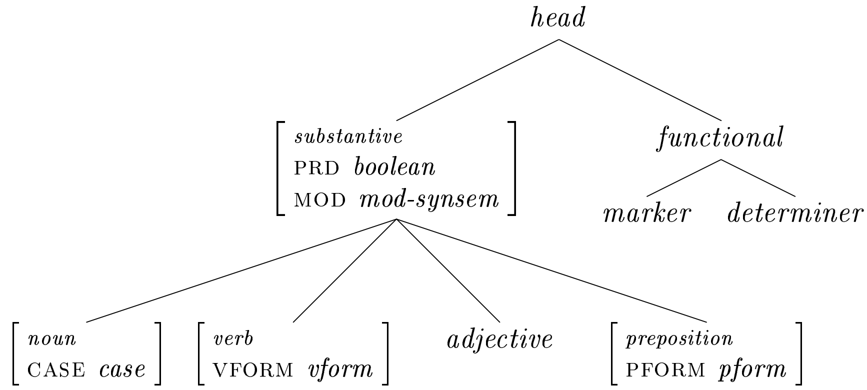
However, any object satisfying the description in (2.6) would violate the HEAD FEATURE PRINCIPLE (2.4) because the value of this object's SYNSEM|LOCAL|CATEGORY|HEAD would be different from its DTRS|HEAD-DTR... HEAD (the former would be of type *verb*, the latter of type *noun*). That is, although the type hierarchy alone licenses structures such as (2.6), the full grammar, containing the constraint (2.4), does not.

Before we move to the phrase structure component of HPSG, a note on HEAD values is in order. According to Pollard and Sag (1994), there are two immediate subtypes of *head*, namely, *substantive* and *functional*, with *substantive* further partitioned into *noun*, *verb*, *adjective* and

[4] The number '1' in $\boxed{1}$ is inessential; (2.4) would be exactly the same principle if both occurrences of $\boxed{1}$ were replaced by, say, $\boxed{927}$. Compare curvy lines linking feature values in LFG.

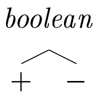
preposition, and *functional* partitioned into *marker* and *determiner*. Taking into consideration also some of the features appropriate for various subtypes of *head*, a type hierarchy for HEAD values which is more realistic than that in (2.5) is given in (2.7) (for English).

(2.7)



Let us briefly explain these new features, as well as their values. First, PRD (for predicate) indicates whether a given *sign* is used predicatively or non-predicatively; its values are, correspondingly, + and − (these are the only two subtypes of *boolean*).

(2.8)



Second, the value of MOD may either be of a special type *none*, or of the familiar type *synsem*. If the value of a *sign*'s SYNSEM|...|HEAD|MOD is *none* then this *sign* does not modify other *sign*s. On the other hand, if it is *synsem*, then this *sign* does modify some other *sign* and, moreover, the SYNSEM value of this modified *sign* is equal to (structure-shared with) this MOD value.

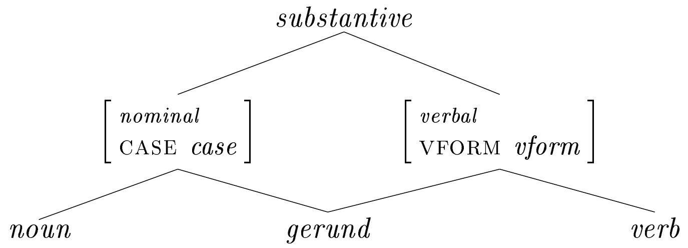
Third, the type *case* is assumed to have *nominative* and *accusative* as its subtypes in English, but this *case* hierarchy will be substantially extended in §3.4.2 and in Chapter 5. Moreover, in languages, such as Polish, in which adjectives inflect for case, the feature CASE must also be present on *adjective*s.

Fourth, possible subtypes of *vform* will depend on what verbal forms a given language has at its disposal. In English, *vform* is assumed to have at least the following subtypes: *finite*, *infinitive*, *gerund*, *base*, *passive-participle*, *present-participle*, and *past-participle*.

Finally, also values of PFORM will depend on a given language; in English they include *to*, *of*, *for*, etc.

The final property of HPSG type hierarchies of the kind illustrated in (2.1), (2.2), (2.5) or (2.7) that we would like to point out is that they do not have to be trees but may be any partial orders. In particular, HPSG allows for *multiple inheritance type hierarchies*, i.e., for types to be subtypes of *several* different types and to inherit their feature specifications. For example, gerunds, exhibiting some nominal and some verbal properties, might be described as having the HEAD value of type *gerund*, where *gerund* is a subtype of, simultaneously, *nominal* and *verbal*:

(2.9)



According to (2.9), objects of type *gerund* bear both CASE and VFORM features.[5]

2.1.2 Phrase Structure Rules

So far, we have seen types, features and constraints. Where do phrase structure rules come in in Head-driven Phrase Structure Grammar? The answer is that they are encoded as a constraint. Before we can look at this constraint, though, we have to say more about values of DTRS, VALENCE and ARG-ST, as well as about list-valued features.

Some features are assumed to have as their values *list*s of objects of a certain type. For example, ARG-ST, a feature encoding a *sign*'s syntactic argument structure, has values of parametric type *list(synsem)*. Similarly, VALENCE has values of type *valence*, which in turn has three features encoding a *sign*'s combinatory potential (to be explained below), namely, SUBJECT, SPECIFIER and COMPLEMENTS, all with values of (parametric) type *list(synsem)*. This means that objects of type *category* will all satisfy the following description:[6]

(2.10)
$$\begin{bmatrix} \textit{category} & \\ \text{HEAD} & \textit{head} \\ \text{VALENCE} & \begin{bmatrix} \textit{valence} & \\ \text{SUBJECT} & \textit{list(synsem)} \\ \text{SPECIFIER} & \textit{list(synsem)} \\ \text{COMPLEMENTS} & \textit{list(synsem)} \end{bmatrix} \\ \text{ARG-ST} & \textit{list(synsem)} \end{bmatrix}$$

Each of such parametric *list(α)* types has two subtypes: *elist*, i.e., the empty list, and *nelist(α)*, a non-empty list of objects of type α.

The use of *elist* can be illustrated with two constraints which ensure that the values of SUBJECT and SPECIFIER are lists of lentgh at most 1 (i.e., there is at most one subject and at most one specifier).

(2.11) $\begin{bmatrix} \text{SUBJECT} & \boxed{1} \end{bmatrix} \rightarrow (\boxed{1} = \textit{elist} \vee \boxed{1} = \langle \boxed{0} \rangle)$

(2.12) $\begin{bmatrix} \text{SPECIFIER} & \boxed{1} \end{bmatrix} \rightarrow (\boxed{1} = \textit{elist} \vee \boxed{1} = \langle \boxed{0} \rangle)$

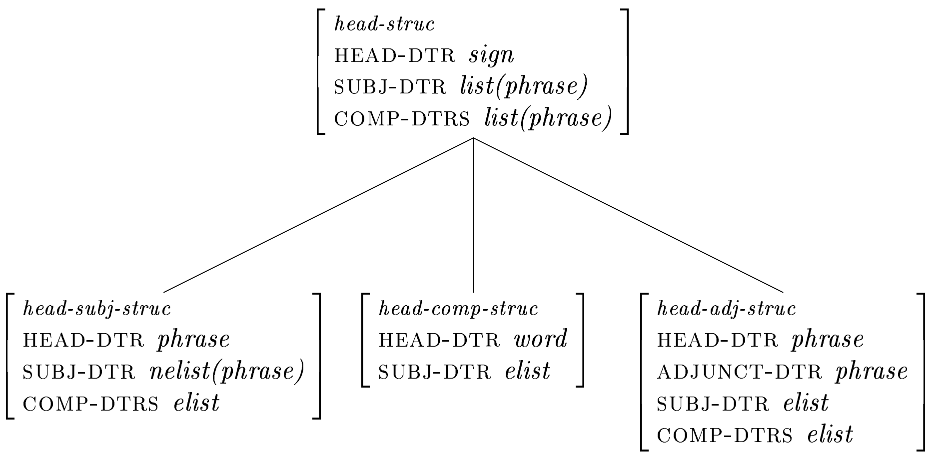
[5] See, e.g., (3.5) on p.47 and (A.4) on p.420 for other examples of such multiple type hierarchies.

[6] The feature SPECIFIER will play only a marginal rôle in this study, so we will ignore it in most of this introduction.

The two constraints above say that, whenever there is an object with the SUBJECT (or SPECIFIER) feature,[7] the value of this feature (i.e., $\boxed{1}$) must be either the empty list (*elist*, sometimes written as '$\langle\rangle$'), or a one-element list ('$\langle\boxed{0}\rangle$'). These 'principles' illustrate well the way HPSG tags (here, $\boxed{0}$ and $\boxed{1}$) work: tags with the same numbers indicate identity (also called 'token identity' and 'structure-sharing'), but only within a single description or constraint. That is, the uses of $\boxed{0}$ and $\boxed{1}$ in (2.11) are independent of the uses of the same tags in (2.12), just as, say, the variable x in one mathematical formula is independent of the same variable in another formula. Note also that the tag $\boxed{0}$ is used in both constraints as a 'place holder', which simply indicates that there is a (single) element on the list, but does not indicate any structure-sharing (there is only one occurrence of $\boxed{0}$ in either constraint).

Let us now turn to values of the DAUGHTERS feature, i.e., to objects of type *head-structure*.[8] The type *head-structure* (abbreviated to *head-struc*) is assumed to have a number of subtypes, including *head-complement-structure* (abbreviated to *head-comp-struc*), *head-subject-structure* (*head-subj-struc*), and *head-adjunct-structure* (*head-adj-struc*). While there are three features appropriate to all *head-struc* objects, i.e., *sign*-valued HEAD-DTR, *list(phrase)*-valued COMP-DTRS, and also *list(phrase)*-valued SUBJ-DTR, objects of type *head-adj-struc* additionally have a *phrase*-valued feature ADJUNCT-DTR.[9]

(2.13)



This bit of the type hierarchy illustrates another property of such HPSG type hierarchies: not only may subtypes add new features to those already declared on their supertypes (cf. ADJUNCT-DTR on *head-adj-struc* in (2.13) or DAUGHTERS in (2.2)), but they may also further constrain values of features already declared. For example, according to (2.13), although the value of feature HEAD-DTR of *head-struc* objects may, in general, be any *sign* (i.e., either a *word* or a *phrase*), in case of *head-adj-struc* and *head-subj-struc*, this value must actually be of type *phrase*, while in case of *head-comp-struc*, it must be of type *word*. Similarly, although in general the value of the feature COMP-DTRS is some list of *phrase*s, when this feature is present on a *head-adj-struc* or *head-subj-struc* object, this list must actually be empty.

[7] According to the specifications so far, this object must be of type *valence*.

[8] Actually, Pollard and Sag (1994) assume a more general type, which does not limit constituency structures to headed structures only. The exact encoding of constituency will not be important in this study.

[9] We ignore here the subtype of *head-struc* relevant for realization of specifiers.

We may now present an outline of the 'phrase structure rule' component of HPSG, which—as we mentioned above—is encoded as just another, albeit rather complex constraint, schematically presented below.

(2.14) IMMEDIATE DOMINANCE PRINCIPLE (schematic):

$$\textit{phrase} \rightarrow (\text{ID-Schema-1} \vee \ldots \vee \text{ID-Schema-}n)$$

According to (2.14), each object of type *phrase* must satisfy one of n descriptions: either ID-Schema-1, or…, or ID-Schema-n. Pollard and Sag (1994) list 6 such schemata, but for our immediate purposes three are most relevant (see §2.1.5 for abbreviations):

(2.15) $$\text{ID-Schema-1} \equiv \begin{bmatrix} \text{SS|LOC|CAT|VAL} & \begin{bmatrix} \text{SUBJ} & \textit{elist} \\ \text{COMPS} & \textit{elist} \end{bmatrix} \\ \text{DTRS} & \textit{head-subj-struc} \end{bmatrix}$$

(2.16) $$\text{ID-Schema-2} \equiv \begin{bmatrix} \text{DTRS} & \textit{head-comp-struc} \end{bmatrix}$$

(2.17) $$\text{ID-Schema-5} \equiv \begin{bmatrix} \text{DTRS} & \textit{head-adj-struc} \end{bmatrix}$$

In order to explain the IMMEDIATE DOMINANCE PRINCIPLE (2.14)–(2.17), we must first introduce another important principle, i.e., VALENCE PRINCIPLE. Since the exact technical formulation of this principle is rather complex, we give here its natural language version:[10]

(2.18) VALENCE PRINCIPLE (ignoring SPECIFIER):

For each *phrase*,

a. the value of SUBJECT of the head daughter is the concatenation of the *phrase*'s SUBJECT value with the list of SYNSEM values of the SUBJ-DTR value;

b. the value of COMPLEMENTS of the head daughter is the concatenation of the *phrase*'s COMPLEMENTS value with the list of SYNSEM values of the COMP-DTRS value.

The main rôle of this principle is to make clear the connection between combinatory potential of *sign*s (encoded as values of the *valence* features SUBJECT and COMPLEMENTS), and their constituent structures (encoded as values of DTRS). It simply says that the values of *valence* features (i.e., SUBJECT, COMPLEMENTS) of a *phrase* are the values of the corresponding *valence* features of the head daughter minus those elements which are syntactically realized as (non-head) daughters.[11]

Now, getting back to the IMMEDIATE DOMINANCE PRINCIPLE (2.14)–(2.17), it simply specifies possible constituent structures of *phrases*.[12] One possibility (cf. ID-Schema-1 in (2.15)) is that

[10] Again, we ignore SPECIFIERS here, which should be added in the full formalization of the VALENCE PRINCIPLE.

[11] Thus, the function of the VALENCE PRINCIPLE is similar to the mechanism of cancellation in CG.

[12] More precisely, it specifies immediate dominance structures; word order is dealt with via separate mechanisms.

the values of the *phrase*'s SUBJECT and COMPLEMENTS features are empty lists, and the value of its DTRS is *head-subj-struc*. Since the type hierarchy (2.13) specifies that each *head-subj-struc* has a *phrase*-valued HEAD-DTR, a *nelist(phrase)*-valued SUBJ-DTR, and an empty list valued COMP-DTRS, each *phrase* adhering to the ID-Schema-1 will have to satisfy the following description:

$$(2.19)\quad \begin{bmatrix} \textit{phrase} & \\ \text{SS}|\text{LOC}|\text{CAT}|\text{VAL} & \begin{bmatrix} \textit{valence} & \\ \text{SUBJ} & \textit{elist} \\ \text{COMPS} & \textit{elist} \end{bmatrix} \\ \text{DTRS} & \begin{bmatrix} \textit{head-subj-struc} & \\ \text{HEAD-DTR} & \textit{phrase} \\ \text{SUBJ-DTR} & \textit{nelist(phrase)} \\ \text{COMP-DTRS} & \textit{elist} \end{bmatrix} \end{bmatrix}$$

This *phrase*, moreover, must satisfy the VALENCE PRINCIPLE (2.18). Let us start with the second part of this principle, i.e., (2.18b). What it says is that the COMPS value of the head daughter is a list concatenation of the COMPS value of the *phrase* with the list consisting of the SYNSEM values of the elements of the COMP-DTRS list. However, both the COMPS list of the *phrase* and its COMP-DTRS list are empty lists (*elist*s), so also the concatenation is the empty list. This means that the COMPS value of the head daughter is *elist*:

$$(2.20)\quad \begin{bmatrix} \textit{phrase} & \\ \text{SS}|\text{LOC}|\text{CAT}|\text{VAL} & \begin{bmatrix} \textit{valence} & \\ \text{SUBJ} & \textit{elist} \\ \text{COMPS} & \textit{elist} \end{bmatrix} \\ \text{DTRS} & \begin{bmatrix} \textit{head-subj-struc} & \\ \text{HEAD-DTR} & \begin{bmatrix} \textit{phrase} & \\ \text{SS}|\text{LOC}|\text{CAT}|\text{VAL}|\text{COMPS} & \textit{elist} \end{bmatrix} \\ \text{SUBJ-DTR} & \textit{nelist(phrase)} \\ \text{COMP-DTRS} & \textit{elist} \end{bmatrix} \end{bmatrix}$$

Similarly, the (2.18a) part of the VALENCE PRINCIPLE relates the SUBJ value of a *phrase* with the SUBJ value of its head daughter and with the SUBJ-DTR value of the *phrase*. Specifically, the SUBJ value of the head daughter is the concatenation of the SUBJ value of the *phrase* with the list consisting of the SYNSEM values of the elements of the SUBJ-DTR list. This time, the value of SUBJ-DTR is a non-empty list of *phrase*s, so, according to the VALENCE PRINCIPLE, also the SUBJ value of the head daughter must be non-empty. In fact, since the SUBJ value of the mother is the empty list, the SUBJ value of the head daughter must be exactly the list of the SYNSEM values of the elements of SUBJ-DTR.

How long may the SUBJ-DTR list be? It must be non-empty according to the specifications in the type hierarchy (2.13) (cf. *nelist(phrase)*). Moreover, since its length is the same as the length of the SUBJ value of the head daughter, it must be no longer than 1; this is guaranteed by the principle (2.11), which says that SUBJ lists have at most one element. So, the only length consistent with various constraints is 1. This means that *phrase*s adhering to the ID-Schema-1 (2.15) will actually have to satisfy the following description:

$$(2.21)\quad \left[\begin{array}{ll}
\textit{phrase} & \\
\text{SS}|\text{LOC}|\text{CAT}|\text{VAL} & \left[\begin{array}{l}\textit{valence}\\ \text{SUBJ } \textit{elist}\\ \text{COMPS } \textit{elist}\end{array}\right] \\
\text{DTRS} & \left[\begin{array}{ll}
\textit{head-subj-struc} & \\
\text{HEAD-DTR} & \left[\begin{array}{ll}\textit{phrase} & \\ \text{SS}|\text{LOC}|\text{CAT}|\text{VAL} & \left[\begin{array}{l}\textit{valence}\\ \text{SUBJ } \langle\boxed{0}\rangle\\ \text{COMPS } \textit{elist}\end{array}\right]\end{array}\right] \\
\text{SUBJ-DTR} & \left\langle\left[\begin{array}{l}\textit{phrase}\\ \text{SS } \boxed{0}\end{array}\right]\right\rangle \\
\text{COMP-DTRS} & \textit{elist}
\end{array}\right]
\end{array}\right]$$

Such complex interaction of relatively simple principles is typical of much of the generative linguistics, including P&P and LFG, but in HPSG, it is usually taken more seriously and rigidly formalized.

Before we conclude this subsection, we will illustrate the principles given so far with the simple sentence *John likes Mary.* Although sentences like this are hardly a challenge for current linguistic theories, including HPSG, the mechanisms employed here are essentially the same as in more interesting cases.

Assume first the following lexical entries for *John*, *Mary* and *likes*:[13]

$$(2.22)\quad \left[\begin{array}{ll}
\textit{word} & \\
\text{PHON John} & \\
\text{SS}|\text{LOC}|\text{CAT} & \left[\begin{array}{ll}\textit{category} & \\ \text{HEAD } \textit{noun} & \\ \text{VAL} & \left[\begin{array}{l}\textit{valence}\\ \text{SUBJ } \textit{elist}\\ \text{COMPS } \textit{elist}\end{array}\right]\end{array}\right]
\end{array}\right]$$

$$(2.23)\quad \left[\begin{array}{ll}
\textit{word} & \\
\text{PHON Mary} & \\
\text{SS}|\text{LOC}|\text{CAT} & \left[\begin{array}{ll}\textit{category} & \\ \text{HEAD } \textit{noun} & \\ \text{VAL} & \left[\begin{array}{l}\textit{valence}\\ \text{SUBJ } \textit{elist}\\ \text{COMPS } \textit{elist}\end{array}\right]\end{array}\right]
\end{array}\right]$$

$$(2.24)\quad \left[\begin{array}{ll}
\textit{word} & \\
\text{PHON likes} & \\
\text{SS}|\text{LOC}|\text{CAT} & \left[\begin{array}{ll}\textit{category} & \\ \text{HEAD } \boxed{0}\textit{verb} & \\ \text{VAL} & \left[\begin{array}{l}\textit{valence}\\ \text{SUBJ } \langle\boxed{1}\text{NP}\rangle\\ \text{COMPS } \langle\boxed{2}\text{NP}\rangle\end{array}\right]\end{array}\right]
\end{array}\right]$$

These lexical entries only mark the value of PHON; see Höhle (1999) and references therein for an articulated description of PHON values. Moreover, two NPs in (2.24) abbreviate the following structures:

[13] These lexical entries are *very* partial; actual lexical entries contain morphosyntactic information more specific than just *noun* or *verb*, and also various kinds of semantic and pragmatic information.

$$(2.25)\qquad \mathrm{NP} \equiv \begin{bmatrix} \textit{synsem} & \\ \textsc{loc}|\textsc{cat} & \begin{bmatrix} \textit{category} & \\ \textsc{head} & \textit{noun} \\ \textsc{val} & \begin{bmatrix} \textit{valence} & \\ \textsc{subj} & \textit{elist} \\ \textsc{comps} & \textit{elist} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

Finally, the tags $\boxed{0}$, $\boxed{1}$ and $\boxed{2}$ in (2.24) are meaningless because each of them occurs only once (so they do not signal any identities of structures). However, since the descriptions (2.22)–(2.24) will be parts of larger descriptions below, these tags will be used to indicate structure-sharing.

Now, the reader is invited to check that the type hierarchy and the constraints given so far license *phrases* satisfying the description (2.26) (ignoring the PHON values), with $\boxed{(2.24)}$ abbreviating the description in (2.24), and $\boxed{\textit{Mary}}$ being defined in (2.27).

$$(2.26)\qquad \begin{bmatrix} \textit{phrase} & \\ \textsc{phon} & \text{likes Mary} \\ \textsc{ss}|\textsc{loc}|\textsc{cat} & \begin{bmatrix} \textit{category} & \\ \textsc{head} & \boxed{0}\textit{verb} \\ \textsc{val} & \begin{bmatrix} \textit{valence} & \\ \textsc{subj} & \langle \boxed{1}\mathrm{NP} \rangle \\ \textsc{comps} & \textit{elist} \end{bmatrix} \end{bmatrix} \\ \textsc{dtrs} & \begin{bmatrix} \textit{head-comp-struc} & \\ \textsc{head-dtr} & \boxed{(2.24)} \\ \textsc{subj-dtr} & \textit{elist} \\ \textsc{comp-dtrs} & \langle \boxed{\textit{Mary}} \rangle \end{bmatrix} \end{bmatrix}$$

$$(2.27)\qquad \boxed{\textit{Mary}} \equiv \begin{bmatrix} \textit{phrase} & \\ \textsc{phon} & \text{Mary} \\ \textsc{ss} & \boxed{2}\mathrm{NP} \\ \textsc{dtrs} & \begin{bmatrix} \textit{head-comp-struc} & \\ \textsc{head-dtr} & \boxed{(2.23)} \\ \textsc{subj-dtr} & \textit{elist} \\ \textsc{comp-dtrs} & \textit{elist} \end{bmatrix} \end{bmatrix}$$

Further, they also license *phrases* like (2.28).

$$(2.28)\qquad \begin{bmatrix} \textit{phrase} & \\ \textsc{phon} & \text{John likes Mary} \\ \textsc{ss}|\textsc{loc}|\textsc{cat} & \begin{bmatrix} \textit{category} & \\ \textsc{head} & \boxed{0}\textit{verb} \\ \textsc{val} & \begin{bmatrix} \textit{valence} & \\ \textsc{subj} & \textit{elist} \\ \textsc{comps} & \textit{elist} \end{bmatrix} \end{bmatrix} \\ \textsc{dtrs} & \begin{bmatrix} \textit{head-subj-struc} & \\ \textsc{head-dtr} & \boxed{(2.26)} \\ \textsc{subj-dtr} & \langle \boxed{\textit{John}} \rangle \\ \textsc{comp-dtrs} & \textit{elist} \end{bmatrix} \end{bmatrix}$$

(2.29) $$\boxed{\textit{John}} \equiv \left[\begin{array}{ll} \multicolumn{2}{l}{\textit{phrase}} \\ \textsc{phon} & \text{John} \\ \textsc{ss} & \boxed{1}\text{NP} \\ \textsc{dtrs} & \left[\begin{array}{ll} \multicolumn{2}{l}{\textit{head-comp-struc}} \\ \textsc{head-dtr} & \boxed{(2.22)} \\ \textsc{subj-dtr} & \textit{elist} \\ \textsc{comp-dtrs} & \textit{elist} \end{array}\right] \end{array}\right]$$

Getting rid of all abbreviations, we obtain the structure corresponding to the utterance *John likes Mary* as given in Figure 2.1 on p.25.[14]

Although the description in Figure 2.1 is still very partial, e.g., it ignores all semantic and pragmatic information, as well as values of ARG-ST, NONLOCAL, and various morphosyntactic features appropriate to *noun* and *verb*, it is already hardly readable. For this reason, it is a common HPSG practice to reveal only relevant bits of information, and also to display the constituent structure in the familiar form of syntactic trees. For example, the structure of Figure 2.1 may be presented as in Figure 2.2 on p.26.

2.1.3 ARG-ST, VALENCE and SUBCAT

If the value of VALENCE encodes combinatory potential of a *sign*, what is the rôle of ARG-ST? In HPSG, ARG-ST encodes the argument structure of a *sign*, normally, of a *word*. How does that differ from VALENCE, though? For one thing, there may be arguments which are never syntactically realized, e.g., *pro*: it makes sense to think of *pro* in *pro*-drop languages (such as, arguably, Polish) as present on ARG-ST but absent from VALENCE. This way, *pro* does not occur anywhere in the syntactic tree, in accordance with the traditional HPSG aversion to syntactic empty categories.

Second, binding is defined in HPSG in terms of ARG-ST, and not in terms of VALENCE. So, if there are two *words* with the same ARG-ST but with different mappings of this ARG-ST into VALENCE,[15] then binding relations among arguments of these *words* should be the same, i.e., they should not depend on syntactic configurations. Such cases are discussed in Manning and Sag (1998, 1999).

Nevertheless, in the unmarked case, it makes sense to think of the value of ARG-ST of a *word* as simply the concatenation of values of the *valence* features SUBJECT, (SPECIFIER,) and COMPLEMENTS, i.e., the first approximation of the relation between ARG-ST and *valence* features can be stated as the following constraint:

(2.30) ARG-ST VS. VALENCE (first approximation):

$$\textit{word} \rightarrow \left[\begin{array}{ll} \textsc{synsem}|\textsc{category} & \left[\begin{array}{ll} \textsc{valence} & \left[\begin{array}{ll} \textsc{subject} & \boxed{1} \\ \textsc{specifier} & \boxed{2} \\ \textsc{complements} & \boxed{3} \end{array}\right] \\ \textsc{arg-st} & \boxed{1} \oplus \boxed{2} \oplus \boxed{3} \end{array}\right] \end{array}\right]$$

[14] We abbreviate here COMP-DTRS to C-DTRS, SUBJ-DTR to S-DTR, HEAD-DTR to H-DTR, SS|LOC|CAT to SLC, and LOC|CAT to LC, as well as write '$\langle\rangle$' for '*elist*'.

[15] For example, the first element of ARG-ST may be mapped into the syntactic SUBJECT, and the second into the COMPLEMENT, or the other way round.

$$
\left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{phrase}} \\
\textsc{phon} & \text{John likes Mary} \\
\textsc{slc} & \left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{category}} \\
\textsc{head} & \boxed{0}\textit{verb} \\
\textsc{val} & \left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{valence}} \\
\textsc{subj} & \langle\rangle \\
\textsc{comps} & \langle\rangle
\end{array}\right]
\end{array}\right] \\
\textsc{dtrs} & \left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{head-subj-struc}} \\
\textsc{h-dtr} & \left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{phrase}} \\
\textsc{phon} & \text{likes Mary} \\
\textsc{slc} & \left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{category}} \\
\textsc{head} & \boxed{0}\textit{verb} \\
\textsc{val} & \left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{valence}} \\
\textsc{subj} & \langle\boxed{1}\rangle \\
\textsc{comps} & \langle\rangle
\end{array}\right]
\end{array}\right] \\
\textsc{dtrs} & \left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{head-comp-struc}} \\
\textsc{h-dtr} & \left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{word}} \\
\textsc{phon} & \text{likes} \\
\textsc{slc} & \left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{category}} \\
\textsc{head} & \boxed{0}\textit{verb} \\
\textsc{val} & \left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{valence}} \\
\textsc{subj} & \left\langle\boxed{1}\left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{synsem}} \\
\textsc{lc} & \left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{category}} \\
\textsc{head} & \textit{noun} \\
\textsc{val} & \left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{valence}} \\
\textsc{subj} & \langle\rangle \\
\textsc{comps} & \langle\rangle
\end{array}\right]
\end{array}\right]
\end{array}\right]\right\rangle \\
\textsc{comps} & \left\langle\boxed{2}\left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{synsem}} \\
\textsc{lc} & \left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{category}} \\
\textsc{head} & \textit{noun} \\
\textsc{val} & \left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{valence}} \\
\textsc{subj} & \langle\rangle \\
\textsc{comps} & \langle\rangle
\end{array}\right]
\end{array}\right]
\end{array}\right]\right\rangle
\end{array}\right]
\end{array}\right]
\end{array}\right] \\
\textsc{s-dtr} & \langle\rangle \\
\textsc{c-dtrs} & \left\langle\left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{phrase}} \\
\textsc{phon} & \text{Mary} \\
\textsc{ss} & \boxed{2} \\
\textsc{dtrs} & \left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{head-comp-struc}} \\
\textsc{h-dtr} & \left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{word}} \\
\textsc{phon} & \text{Mary} \\
\textsc{slc} & \left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{category}} \\
\textsc{head} & \textit{noun} \\
\textsc{val} & \left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{valence}} \\
\textsc{subj} & \langle\rangle \\
\textsc{comps} & \langle\rangle
\end{array}\right]
\end{array}\right]
\end{array}\right] \\
\textsc{s-dtr} & \langle\rangle \\
\textsc{c-dtrs} & \langle\rangle
\end{array}\right]
\end{array}\right]\right\rangle
\end{array}\right]
\end{array}\right] \\
\textsc{s-dtr} & \left\langle\left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{phrase}} \\
\textsc{phon} & \text{John} \\
\textsc{ss} & \boxed{1} \\
\textsc{dtrs} & \left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{head-comp-struc}} \\
\textsc{h-dtr} & \left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{word}} \\
\textsc{phon} & \text{John} \\
\textsc{slc} & \left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{category}} \\
\textsc{head} & \textit{noun} \\
\textsc{val} & \left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{valence}} \\
\textsc{subj} & \langle\rangle \\
\textsc{comps} & \langle\rangle
\end{array}\right]
\end{array}\right]
\end{array}\right] \\
\textsc{s-dtr} & \langle\rangle \\
\textsc{c-dtrs} & \langle\rangle
\end{array}\right]
\end{array}\right]\right\rangle \\
\textsc{c-dtrs} & \langle\rangle
\end{array}\right]
\end{array}\right]
$$

Figure 2.1: *John likes Mary*

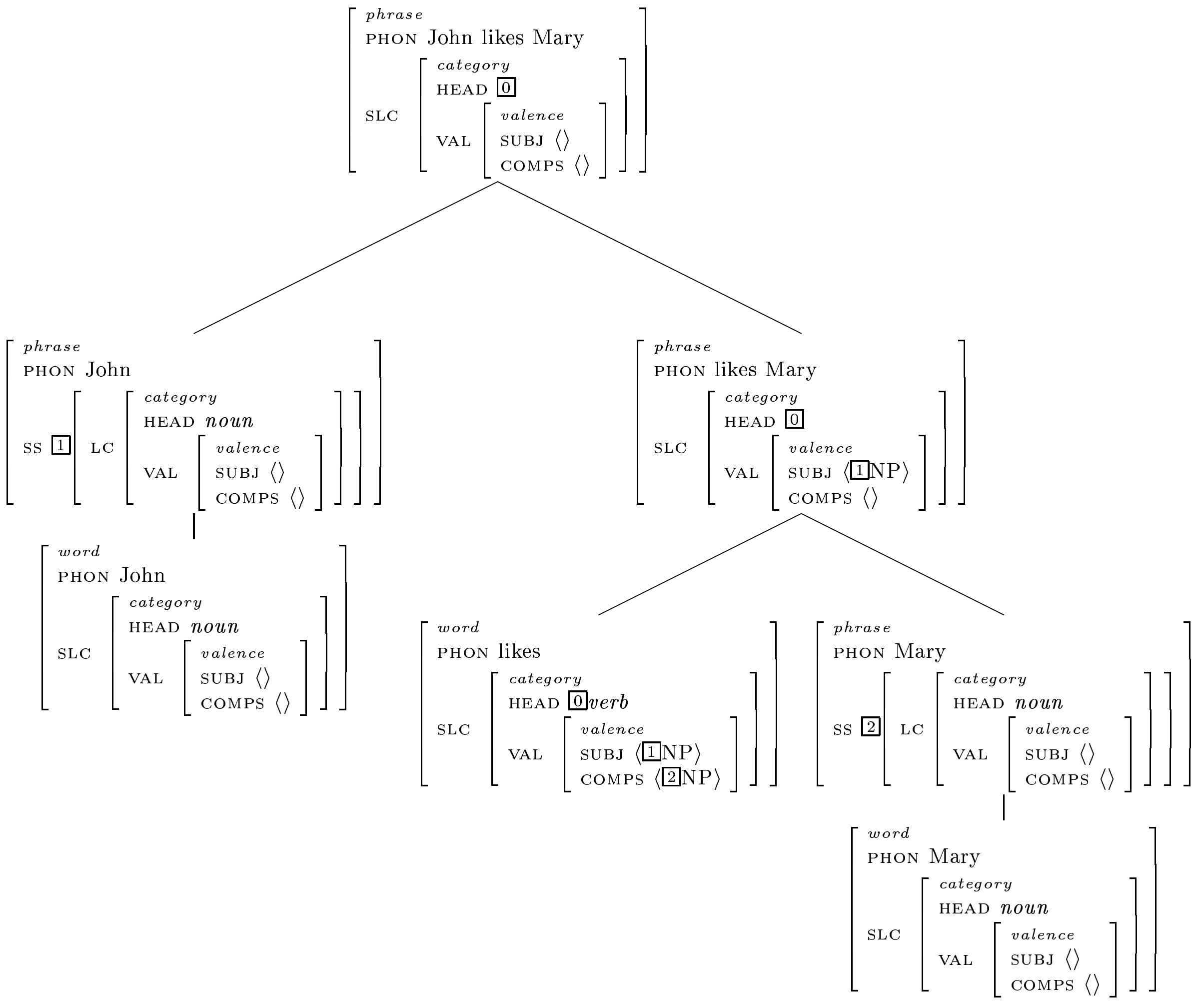


Figure 2.2: Tree representation for *John likes Mary*

In prose, for each *word*, the value of its ARG-ST is the list which is the result of appending (cf. '$\oplus$') the lists being the values of SUBJECT, SPECIFIER and COMPLEMENTS, in that order.

In fact, due to this close relationship, ARG-ST and VALENCE were not distinguished for the first decade of HPSG; Pollard and Sag (1994) still define both cancellation of arguments (cf. the combinatory potential) and binding in terms of a single feature, SUBCAT. The feature SUBCAT will often appear in our discussions of previous HPSG approaches to case assignment and to modification.

2.1.4 Lexicon

We mentioned above *lexical entries*, and even gave partial lexical entries for *John*, *Mary* and *likes*. What are lexical entries in a formalism whose main constructs are type hierarchy and constraints?

The simplest approach, briefly discussed in Höhle (1999), is to posit a 'word principle', schematically presented in (2.31), where LE-k ($k = 1, 2, \ldots, m$) stand for particular lexical entries, such as those in (2.22)–(2.24) above.

(2.31) WORD PRINCIPLE (schematic):

$$\textit{word} \rightarrow \text{LE-1} \vee \text{LE-2} \vee \ldots \vee \text{LE-}m$$

Of course, since such a principle fails to relate, say, different forms of a lexeme, or make generalizations about word classes, it is unsatisfactory from the theoretical point of view, and blatantly unrealistic from the psycholinguistic point of view.[16] For this reason, a number of ways of structuring the lexicon have been proposed in HPSG, including so-called hierarchical lexicons (or hierarchies of lexical types) and *lexical rules*.

However, both mechanisms have proven resistant to linguistically satisfying formalization, and they are still a subject of ongoing research. Because of this, and because we will ignore the exact structure of the lexicon in most of this study, we assume for concreteness that lexical entries are introduced by a constraint such as (2.31), i.e., we do not make any assumptions about the structure of the lexicon. The reader interested in discussion of hierarchical lexicons in referred to Flickinger (1987), Riehemann (1993, 1994), Davis (1997) and Koenig (1999b), while various formalizations of lexical rules are proposed in Calcagno (1995) and Meurers (1995, 1999a).

Before we conclude this subsection, a terminological note on our use of the notion *lexical* is in order. In the following chapters, we will call *lexical* those properties of a *word* object which are idiosyncratically stated in a lexical entry (see LE-1, etc., in (2.31) above) corresponding to this object. Thus, for example, an analysis which consists in positing a number of lexical entries will be called *lexical*, while an analysis which consists in proposing a general grammatical constraint, even if it is a constraint of the type '*word* $\rightarrow \ldots$', will *not* be called *lexical*.

[16]It is a well-established psycholinguistic fact that words are not listed separately in the 'mental lexicon', but form a complex mesh which relates words with similar meanings, similar phonologies, etc. (Aitchison, 1994; Altmann, 1997).

2.1.5 Abbreviatory Conventions and Terminology

In this section, we summarize HPSG abbreviations and terminology used in this study.

First, as already mentioned above, various abbreviations of feature names (and paths; see below) and types are often used in HPSG. Here are the most common.

Features:

Abbreviation:	Full form:
ADJ-DTR	ADJUNCT-DAUGHTER
ARG	ARGUMENT
ARG-ST	ARGUMENT-STRUCTURE
CAT	CATEGORY
COMP-DTRS	COMPLEMENT-DAUGHTERS
COMPS	COMPLEMENTS
CONT	CONTENT
CTXT	CONTEXT
DEPS	DEPENDENTS
DTRS	DAUGHTERS
HEAD-DTR, HD-DTR	HEAD-DAUGHTER
LC	LOCAL|CATEGORY
LOC	LOCAL
NEW-QS	NEW-QUANTIFIERS
NONLOC, NLOC	NONLOCAL
NUM	NUMERAL
QSTORE	QUANTIFIER-STORE
QUANTS	QUANTIFIERS
SLC	SYNSEM|LOCAL|CATEGORY
SS, SYNS	SYNSEM
SUBJ	SUBJECT
SUBJ-DTR	SUBJECT-DAUGHTER
VAL	VALENCE

Types:

Abbreviation:	Full form:
arg	*argument*
fin	*finite*
gap-ss	*gap-synsem*
head-adj-struc	*head-adjunct-structure*
head-comp-struc, *h-c-str*	*head-complement-structure*
head-struc	*head-structure*
head-subj-struc	*head-subject-structure*
inf	*infinitive*
val	*valence*

Second, there are various abbreviatory conventions used when presenting HPSG description. We have already seen one in §2.1.2 (cf. (2.25) on p.23). Some other most common abbreviatory conventions are given below:

- *verb*[*fin*] abbreviates $\begin{bmatrix} \textit{verb} \\ \text{VFORM} \ \textit{fin} \end{bmatrix}$, *noun*[*nom*] abbreviates $\begin{bmatrix} \textit{noun} \\ \text{CASE} \ \textit{nom} \end{bmatrix}$, etc.;
- NP[*nom*] abbreviates $\begin{bmatrix} \textit{synsem} \\ \text{LOC}|\text{CAT} \ \begin{bmatrix} \textit{category} \\ \text{HEAD} \ \begin{bmatrix} \textit{noun} \\ \text{CASE} \ \textit{nom} \end{bmatrix} \\ \text{VAL} \ \begin{bmatrix} \textit{valence} \\ \text{SUBJ} \ \langle\rangle \\ \text{COMPS} \ \langle\rangle \end{bmatrix} \end{bmatrix} \end{bmatrix}$, etc.;
- $\boxed{1}{:}\boxed{2}$ abbreviates $\boxed{1}[\ldots|\text{CONT} \ \boxed{2}]$; e.g.,

  NP:$\boxed{0}$ abbreviates $\begin{bmatrix} \textit{synsem} \\ \text{LOC} \ \begin{bmatrix} \text{CAT} \ \begin{bmatrix} \textit{category} \\ \text{HEAD} \ \textit{noun} \\ \text{VAL} \ \begin{bmatrix} \textit{valence} \\ \text{SUBJ} \ \langle\rangle \\ \text{COMPS} \ \langle\rangle \end{bmatrix} \end{bmatrix} \\ \text{CONT} \ \boxed{0} \end{bmatrix} \end{bmatrix}$, etc.;
- $\boxed{1}_{\boxed{2}}$ abbreviates $\boxed{1}[\ldots|\text{INDEX} \ \boxed{2}]$; e.g.,

  NP$_{\boxed{i}}$ abbreviates $\begin{bmatrix} \textit{synsem} \\ \text{LOC} \ \begin{bmatrix} \text{CAT} \ \begin{bmatrix} \textit{category} \\ \text{HEAD} \ \textit{noun} \\ \text{VAL} \ \begin{bmatrix} \textit{valence} \\ \text{SUBJ} \ \langle\rangle \\ \text{COMPS} \ \langle\rangle \end{bmatrix} \end{bmatrix} \\ \text{CONT}|\text{INDEX} \ \boxed{i} \end{bmatrix} \end{bmatrix}$, etc.

Third, there are alternative terms for *feature* and *type*, namely, *attribute* and *sort*, respectively. We will use the terms *feature* and *attribute* interchangeably, and we will also not distinguish between *types* and *sorts*.

Fourth, a sequence of attributes (features) is called a *path*. So, e.g., SYNSEM|LOCAL|CATEGORY is a path. It is a common HPSG practice to ignore prefixes of such paths, e.g., the structure in (2.28) could be displayed as:

(2.32) $$\begin{bmatrix} \textit{phrase} \\ \text{PHON} \ \text{John likes Mary} \\ \text{HEAD} \ \boxed{0}\textit{verb} \\ \text{SUBJ} \ \langle\rangle \\ \text{COMPS} \ \langle\rangle \\ \text{DTRS} \ \ldots \end{bmatrix}$$

We will avoid this practice here as potentially confusing, but when discussing work of other authors, we will often cite their original descriptions, without trying to reconstruct such missing prefixes.

Finally, we will use the single arrow '$\rightarrow$' as a logical (implicational) connector in constraints, and the double arrow '$\Rightarrow$' in lexical rules.

2.2 Polish

Since Polish is the main empirical source of this study, this section briefly presents some of the most conspicuous features of this language.

2.2.1 Inflection

Polish is an inflectional (fusional) language.

Polish **nouns** have *grammatical gender*. Traditionally, three genders are distinguished, masculine, neuter and feminine, although it is clear that a more fine-grained distinction is necessary (Mańczak, 1956; Saloni and Świdziński, 1985, 1998; Czuba, 1997). Here, we will ignore the finer points of the Polish gender system and we will assume the existence of the following genders: virile (i.e., 'masculine-human'), non-virile masculine, neuter, and feminine. When no distinction is made between virile and non-virile masculine, we will talk about masculine gender, and when referring to any gender apart from virile, we will talk about non-virile (sometimes also called 'non-masculine-human') gender.

Most nouns inflect for *number*, which may either be singular or plural. Although there are reasons to treat number and gender as just two aspects of a single morphosyntactic category (see Czuba (1997), Czuba and Przepiórkowski (1995), and Świdziński (1992a, p.86)), we will adopt the traditional view here.

Nouns inflect also for *case*, a category which is traditionally assumed to involve seven values in Polish: nominative, accusative, genitive, dative, instrumental, locative and vocative. We will have more to say about Polish case system in Chapter 5.

Here are some examples of inflectional paradigm of Polish nouns:[17]

(2.33) *facet* 'guy' (a virile noun):

	SINGULAR	PLURAL
NOM	facet	faceci
ACC	faceta	facetów
GEN	faceta	facetów
DAT	facetowi	facetom
INS	facetem	facetami
LOC	facecie	facetach
VOC	facecie	faceci

[17] In the paradigms below, cases are listed in a somewhat non-standard order to make various NOM/ACC and ACC/GEN syncretisms more conspicuous.

(2.34) *pies* 'dog', *stół* 'table' (masculine non-virile nouns):

	SINGULAR	PLURAL	SINGULAR	PLURAL
NOM	pies	psy	stół	stoły
ACC	psa	psy	stół	stoły
GEN	psa	psów	stołu	stołów
DAT	psu	psom	stołu	stołom
INS	psem	psami	stołem	stołami
LOC	psie	psach	stole	stołach
VOC	psie	psy	stole	stoły

(2.35) *okno* 'window' (a neuter noun):

	SINGULAR	PLURAL
NOM	okno	okna
ACC	okno	okna
GEN	okna	okien
DAT	oknu	oknom
INS	oknem	oknami
LOC	oknie	oknach
VOC	okno	okna

(2.36) *dziewczyna* 'girl' (a feminine noun):

	SINGULAR	PLURAL
NOM	dziewczyna	dziewczyny
ACC	dziewczynę	dziewczyny
GEN	dziewczyny	dziewczyn
DAT	dziewczynie	dziewczynom
INS	dziewczyną	dziewczynami
LOC	dziewczynie	dziewczynach
VOC	dziewczyno	dziewczyny

As far as **verbal inflection** is concerned, *aspect* is considered *not* to be an inflectional category, but rather a derivational one.[18] There are three *tenses* in contemporary Polish: past, present and future. Perfective verbs occur in past and in future tenses, while imperfective verbs have past and present forms, as well as an analytical future form, with the auxiliary *być* 'be' and either the infinitival or the so-called past participle form of the verb (see below):

(2.37) *kupić* 'buy' (perfective):
kupiłem / kupię
buy$_{pst,1st,sg,masc}$ / buy$_{fut,1st,sg,masc}$
'I bought / I will buy'

[18] See, e.g., Saloni and Świdziński (1998), as well as Spencer (1991, pp.195–197) for a discussion of difficulties involved in deciding whether aspect is an inflectional or a derivational category in another Slavic language, namely, Russian.

(2.38) *kupować* 'buy' (imperfective):

kupowałem	/ kupuję	/ będę	kupować/kupował
$\text{buy}_{pst,1st,sg,masc}$	/ $\text{buy}_{pres,1st,sg}$	/ $\text{Aux}_{1st,sg}$	buy_{inf}/$\text{buy}_{pstp,sg,masc}$

'I was buying / I am buying / I will be buying'

Verbs also inflect for *person* and *number*, as well as, in the past tense, for *gender* (masculine, nueter and feminine in case of singular number, virile and non-virile in case of plural number), e.g.:

(2.39) *kupować* 'buy' (imperfective), PRESENT TENSE:

	SINGULAR	PLURAL
1ST	kupuję	kupujemy
2ND	kupujesz	kupujecie
3RD	kupuje	kupują

(2.40) *kupić* 'buy' (perfective), PAST TENSE:

	SINGULAR			PLURAL	
	MASC	NEUT	FEM	VIRILE	NON-VIRILE
1ST	kupiłem	kupiłom	kupiłam	kupiliśmy	kupiłyśmy
2ND	kupiłeś	kupiłoś	kupiłaś	kupiliście	kupiłyście
3RD	kupił	kupiło	kupiła	kupili	kupiły

Apart from these finite forms, there are various non-finite forms: *infinitival* (perfective: *kupić*, imperfective: *kupować*), *impersonal -no/-to* forms (perfective: *kupiono*, imperfective: *kupowano*), *present adverbial participle* (created from an imperfective verb, e.g., *kupując* 'buying'), *past adverbial participle* (created from a perfective verb, e.g., *kupiwszy* 'having bought'), *active adjectival participle* (created from an imperfective verb, e.g., *kupujący*), and *passive adjectival participle* (perfective: *kupiony*, imperfective: *kupowany*).[19] Some authors also distinguish so-called past participles (sometimes called *l*-participles), i.e., forms identical to third person forms in past tense (see the last row in (2.40)), as they may occur without the '3rd person meaning', e.g., in analytical future forms.[20]

Finally, Polish **adjectives** inflect for number, gender and case, cf.:

(2.41) *biały* 'white':

[19] Inflectionally, adjectival participles are adjectives (they inflect for case, gender and number), and adverbial participles are adverbs.

[20] More interestingly, past forms, as in (2.40), are usually analysed as combinations of such past participles with a detachable affix or clitic, which plays the rôle of a verbal auxiliary. For discussion, see Borsley and Rivero (1994), Borsley (1999b), Franks and Bański (1999), Franks and King (1999), and references therein.

	SINGULAR			PLURAL	
	MASC	NEUT	FEM	VIRILE	NON-VIRILE
NOM	biały	białe	biała	biali	białe
ACC	białego	białe	białą	białych	białe
GEN	białego	białego	białej	białych	białych
DAT	białemu	białemu	białej	białym	białym
INS	białym	białym	białą	białymi	białymi
LOC	białym	białym	białej	białych	białych
VOC	*same as* NOM *(for all person/gender combinations)*				

Other morphosyntactic categories in Polish, as distinguished by Saloni and Świdziński (1985, 1998) on the basis of their inflectional properties, are numerals (they inflect for case and gender, but not number; we will adopt a different definition of numerals in §5.3) and various non-inflecting categories, e.g., prepositions and adverbs/particles.[21]

2.2.2 Agreement

The two main types of agreement in Polish are adjective–noun agreement and subject–verb agreement.

A pre-modifying adjective must agree with the noun in number, (grammatical) gender and case, e.g.:

(2.42) a. miłe dziewczę
nice$_{nom/acc,sg,neut}$ girl$_{nom/acc,sg,neut}$

b. miłymi dziewczętami
nice$_{ins,pl,neut}$ girls$_{ins,pl,neut}$

c. *miła dziewczę
nice$_{nom,sg,fem}$ girl$_{nom/acc,sg,neut}$

The nominative subject agrees with the verb in person, number and gender, e.g.:[22]

(2.43) a. Miłe dziewczę przyszło.
nice$_{nom,sg,neut}$ girl$_{nom,sg,neut}$ came$_{3rd,sg,neut}$
'A nice girl came.'

b. *Miłe dziewczę przyszłom.
nice$_{nom,sg,neut}$ girl$_{nom,sg,neut}$ came$_{1st,sg,neut}$

c. *Miłe dziewczę przyszła.
nice$_{nom,sg,neut}$ girl$_{nom,sg,neut}$ came$_{3rd,sg,fem}$

[21] Saloni and Świdziński (1985, 1998) also subdivide verbs into 'proper' verbs (Polish: *czasowniki właściwe*) and quasi-verbs (Polish: *czasowniki niewłaściwe*), although some aspects of this subdivision are problematic; cf. Świdziński (1993, 1999b) and Przepiórkowski (1995, 1997d) for discussion.

[22] Note, incidentally, that Polish does not have definite/indefinite articles.

In the rare cases of mismatches between the morphosyntactic gender and the semantic (i.e., *index*, in terms of HPSG) gender of a noun, the modifying adjective agrees with the morphosyntactic gender, while the verb agrees with the semantic gender of the noun, e.g.:[23]

(2.44) Wasza wspaniałomyślna wysokość przyszedł.
your$_{fem}$ magnanimous$_{sg,fem}$ highness$_{sg,fem}$ came$_{3rd,sg,masc}$

'Your magnanimous highness have come.'

2.2.3 Word Order

Polish has relatively free word order. For example, a simple finite clause with an NP subject, an NP object and a locative adjunct may normally be linearly realized in 24 different ways corresponding to 24 different permutations of the verb, the subject, the object and the adjunct. Here are just some of these possibilities:

(2.45) Janek zobaczył Marysię dwa dni temu.
John$_{nom}$ saw$_{3rd,sg,masc}$ Mary$_{acc}$ two days ago

'John saw Mary two days ago.'

(2.46) Zobaczył Janek dwa dni temu Marysię.

(2.47) Marysię dwa dni temu Janek zobaczył.

(2.48) Dwa dni temu Marysię zobaczył Janek.

etc.

Thus, word order cannot be employed to, say, distinguish complements from adjuncts the way it can (to some extent) in English.

It is also not immediately clear whether Polish should be classified as an SVO language; the usual argument for the stance that Polish should be regarded as an SVO, and not an OVS, language is that, in the so-called neutral context and neutral intonation, in cases of nominative/accusative syncretism (and in absence of other clues), the preverbal NP tends to be interpreted as the subject, and the postverbal NP — as the object, e.g.:[24]

(2.49) Autobus wyprzedził samochód.
bus$_{nom/acc}$ overtook car$_{nom/acc}$

'A bus overtook a car.'
?'A car overtook a bus.'

[23]See Corbett (1983) for discussion of agreement and mismatches of this kind across Slavic, and Czuba and Przepiórkowski (1995) for an HPSG analysis of agreement in Polish, including cases like (2.44).

[24]Another argument could be that the SVO order is textually more frequent than the OVS order; see Świdziński (1996, pp.110–113) for quantitative characteristics.

(2.50) Samochód wyprzedził autobus.
car$_{nom/acc}$ overtook bus$_{nom/acc}$
'A car overtook a bus.'
?'A bus overtook a car.'

However, this tendency, if indeed any, is very weak.

On the other hand, word order in Polish is not completely free. First, the order of sentence constituents is often linked to information structure (topic–focus, or theme–rheme). Second, word order within noun phrases (NPs) and prepositional phrases (PPs) is much stricter, e.g., arguments of prepositions follow them, full NP arguments of nouns also follow the noun heads, while adjectival modifiers usually precede the noun, etc. Third, clitics, while freer than in other Slavic languages in that they are not constrained to 'Wackernagel's position', are linearly more constrained than prosodically independent constituents: not only are they forbidden in sentence initial positions and strongly dispreferred in sentence final positions, but they also must occur before the verbal head, or immediately after it.[25] Fourth, although discontinuities are possible, they are rather restricted.

A matter related to the last point is extraction. There is some controversy about what exactly can be extracted out of what kinds of finite clauses (cf. §8.2.3); in any case, such extractions are usually more restricted than corresponding English examples. For example, although English (2.51) is acceptable, Polish (2.52) is at best marginal.[26]

(2.51) Who$_i$ did you tell Mary that John hit __$_i$?

(2.52) ??Kogo$_i$ powiedziałeś Marii, że Janek uderzył __$_i$?
who$_{acc}$ told$_{2nd,sg,masc}$ Mary$_{dat}$ Comp John$_{nom}$ hit

On the other hand, it is possible to 'extract' pre-modifiers from NPs, in apparent violation of Ross's (1967) Left Branch Condition (Borsley, 1983b,a):

(2.53) Jaką chciałaś założyć sukienkę?
what$_{adj,acc}$ wanted$_{2nd,sg,fem}$ put$_{inf}$ on dress$_{acc}$
'What dress did you want to put on?'

Finally, although extraction out of finite clauses (or, more accurately, out of clauses introduced by a complementizer) is restricted, infinitival environments exhibit the relatively free word order characteristic for simple clauses, which suggests some kind of 'clause union' effect.

In summary, Polish word order is relatively free in the sense that the basic constituents of a simple clause may, in principle, occur in any order, and also in the sense that various kinds of discontinuous constituencies are allowed, but it is restricted in the sense that different linearizations seem to correspond to different information structures, word order within NPs

[25] Matters are more complex; see, e.g., Witkoś (1996b, 1998), Rappaport (1997), Franks (1998a), Kupść (1999c,b,e), and Franks and King (1999).

[26] But there are structurally similar sentences which do sound acceptable; for discussion of *wh*-movement in Polish, see, e.g., Giejgo (1981), Kardela (1986b), Bobrowski (1988), Rudin (1988, 1989), Willim (1989), Witkoś (1993, 1995), Dornisch (1998).

and PPs is (relatively) strict, extraction out of constituents is constrained, and clitics must obey certain rules of placement. See Derwojedowa (1998) and Kubiński (1999) for two recent (and very different) approaches to word order in Polish, and for further references.

Part I

Case Assignment

This first contentful Part of this study is devoted to case; its aim is to develop a non-configurational constraint-based approach to syntactic case assignment, to the best of our knowledge, the first such worked out formal non-configurational analysis of case assignment.

First, in Chapter 3, we will discuss previous approaches to grammatical case, both traditional, and within the generative theories Government and Binding (GB), Lexical-Functional Grammar (LFG) and Head-driven Phrase Structure Grammar (HPSG), and we will indicate differences and similarities between those approaches and the approach to be developed here.

Then, in Chapter 4, we will point out various problems with previous HPSG approaches to case assignment, and we will present our account, eschewing tree-configurationality and based on the hierarchy of grammatical functions (i.e., on the obliqueness hierarchy) instead. In particular, we will claim that our approach, unlike other approaches in the HPSG literature, is general enough to be applied to data from a wide range of languages, is modular in the sense of being compatible with various analyses of other phenomena, and satisfies various conceptual postulates found in the (HPSG and non-HPSG) literature.

Finally, in Chapter 5, we will apply this approach to a number of interesting case phenomena in Polish, a language which, with its seven (or so) morphological cases, provides a good testbed for any general theory of case assignment. The three phenomena we will look into in considerable detail will be the so-called Genitive of Negation, complex case patterns of numeral phrases, and interactions between case assignment and predication.

Chapter 3

Previous Approaches to Case

Case has been in the foreground of linguistic research for millenia, and we cannot even hope to scratch the surface of the literature devoted to its study.[1] In this Chapter, we will only briefly review some of the most prominent approaches to case in the last decades.

First, in §3.1, we will look at some approaches to the problem of delimiting and classifying cases. Then, we will concisely present the approaches to case in two contemporary linguistic theories which greatly influenced HPSG, namely, Government and Binding (GB) in §3.2 and Lexical-Functional Grammar (LFG) in §3.3. Finally, in §3.4 we will look at previous HPSG analyses of case assignment, postponing their evaluation to the next Chapter.

3.1 What is Case?

This simple question turns out to be far from trivial and, to the best of our knowledge, no generally satisfactory and formally precise answer has been developed. In fact, in view of radically different approaches to the study of case present in contemporary linguistics, it is doubtful that any such answer will be agreed upon in the foreseeable future.

This, however, is not a reason for despair. After all, most of present day linguistics is built on often ill-defined notions whose exact definition is a matter of contention. In this section, we will look at some attempts at defining, delimiting and classifying cases.

3.1.1 Delimiting Cases

It is important to realize that the notion *case* is overloaded, with some confusion resulting from not distinguishing the different uses of the term.

A lucid distinction among three different basic meanings of *case* is contained in Mel'čuk (1986), and we cannot do better than cite the relevant passage here:

> [*Case*] is, as currently used in linguistics, at least three-way ambiguous:

[1] See Blake (1994, pp.19–20) on the origins of the study of case.

> 1. *Case 1* = a (grammatical or, more precisely, inflectional) category; this sense can be seen in such sentences as: "The Czech noun is inflected for case; Tartar possesses case as an autonomous category; Case is widely discussed nowadays."
> 2. *Case 2* = an element... of case 1, i.e., a specific case: nominative, accusative, superessive, etc. Cf.: "Bats has twenty-two cases; The nominative is the case of naming objects; This verb requires the dative case."
> 3. *Case 3* = a case form, i.e., a linguistic form which expresses a case 2 (roughly, a particular case marker or a particular wordform); cf. "*Členami* is in Russian the instrumental case of *člen* 'member' in the plural; The genitive case never appears after plural in regular English nouns; Give me the dative case of *chłopiec* both in singular and plural."
>
> (Mel'čuk, 1986, p.37)

The distinction between what Mel'čuk (1986) calls *case 1* and his *case 2* is rather clear but, as also noted by Wierzbicka (1981), Goddard (1982) and Comrie (1986), linguists tend to confuse notions *case 2* and *case 3*. In this study, we will be talking almost exclusively about *case 1* and *cases 2*, largely ignoring morphological issues concerning *cases 3*.[2] For this reason, we trust that our use of the term *case*, without any subscripts or modifiers, will not lead to confusion.

As discussed in the first three papers in Brecht and Levine (1986b), namely Brecht and Levine (1986a), Mel'čuk (1986) and, especially, Comrie (1986) (all three should be required readings for anybody dealing with case), there are two important and related, but distinct issues to deal with when trying to answer the question "What is case?":

- the *external delimitation of case*, i.e., how to distinguish case (Mel'čuk's (1986) *case 1*) from other categories;
- the *internal delimitation of case*, i.e., how to "establish the number and identity of the cases [Mel'čuk's (1986) *cases 2*; A.P.] in a given language" (Comrie, 1986, p.88).

The first issue is extensively dealt with by Mel'čuk (1986), while the second is discussed in detail by Comrie (1986). Below we will give one example, from Polish, showing that both issues are non-trivial.

Consider possessive phrases in examples (3.1)–(3.2) below.

(3.1) a. moja książka / książka Janka
my$_{poss,nom}$ book$_{nom}$ / book$_{nom}$ John$_{gen}$
'my/John's book'

b. mojej książce / książce Janka
my$_{poss,dat}$ book$_{dat}$ / book$_{dat}$ John$_{gen}$
'(to/for) my/John's book'

(3.2) a. moje przybycie / przybycie Janka
my$_{poss,nom}$ arrival$_{nom}$ / arrival$_{nom}$ John$_{gen}$

[2] However, in Chapter 5 (§5.3.1.1) we will try to determine the *case 2* of numeral phrases in subject position in Polish, a matter unsettled and controversial because of the syncretism of relevant *cases 3*.

'my/John's arrival'

b. mojemu przybyciu / przybyciu Janka
my$_{poss,dat}$ arrival$_{dat}$ / arrival$_{dat}$ John$_{gen}$
'(to/for) my/John's arrival'

Now, the question concerning these examples is, how should we characterize the 'possessive' position occupied by *moje*/*mojemu* and *Janka* above? Note that it makes some sense to talk about a single syntactic position as, in (3.2) involving a verbal noun (gerund), it corresponds to the subject position of the corresponding verb and shows similar subject characteristics (e.g., phrases occupying it may bind a reflexive anaphor).

The traditional answer, i.e., that such a 'possessive' position may be occupied either by possessive pronouns or by genitive nouns is hardly satisfactory.[3] A more elegant alternative position would be that there is some category whose value distinguishes these 'possessive' pronouns and genitive nouns from other nominal forms. Is this category simply case (Mel'čuk's (1986) *case 1*), or is this is a separate category? This is an 'external delimitation of case' problem.

The standard, even if usually implicit answer seems to be that this is a separate category, call it 'possessiveness'. But an alternative answer, i.e., that—by analogy with the ad-verbal subject position—such a 'possessive' position is actually a case position is also viable. However, adopting this hypothesis would immediately raise the 'internal delimitation of case' problem: how many new cases would we have to posit in addition to cases standardly assumed in Polish grammars? Note that, although the form of nouns is always identical to genitive, the form of the 'possessive' pronominal changes with the case of the whole NP; does this mean that we need seven new cases in Polish, i.e., 'possessive-nominative', 'possessive-accusative', etc., in addition to nominative, accusative, etc.?

However fascinating the issues of external and internal delimitation of cases are, we will not deal with them in this study. In particular, in Chapter 5, devoted to case in Polish, we will assume the traditional approach to both issues, although it could be challenged in a number of ways.[4]

3.1.2 Taxonomy of Cases

Are cases (Mel'čuk's (1986) *cases 2*) semantic or purely formal entities? In other words, do cases have meanings? As discussed in Brecht and Levine (1986a), there are two extreme positions, and both are present in current linguistic theorizing.

One extreme position, championed by Jakobson (1971a,b) and further developed in various works by Anna Wierzbicka (e.g., Wierzbicka (1980, 1981, 1983, 1986)), is that all "cases have meanings and that this meaning can be stated in a precise and illuminating way" (Wierzbicka, 1986, p.386). The other extreme is the position taken in Chomsky's Government and Binding

[3] And it also raises a number of questions concerning formal characteristics of such possessive pronouns, which we will not go into in the interest of brevity.

[4] Among the problematic areas are: the status of the vocative case, the existence of a distributive case (governed by the distributive preposition *po*), and, in our opinion, the status of 'possessive' dependents of nominals, indeed.

(GB) theory, and even more so in the Minimalist Program (MP), according to which case is an abstract syntactic category, without any inherent meaning.[5]

Both extremes are criticised by Kuryłowicz (1948, 1949), who argues that cases may have both functions. More precisely, Kuryłowicz (1948, 1949) distinguishes between what he calls *grammatical cases*, such as accusative, whose primary function is purely syntactic, but which may also have a secondary semantic function (e.g., the temporal accusative), and what he calls *concrete cases*, such as dative, whose primary function is semantic, but which may also have a secondary purely syntactic function, e.g., when lexically required by a verb. This more balanced view on the syntactic/semantic case dichotomy is also explicitly adopted by Mel'čuk (1986), who, however, notes that, although cases may have meanings, they are first of all syntactic entities; "conveying meanings is their secondary, non-obligatory property" (Mel'čuk, 1986, p.45).

Mel'čuk (1986, pp.60–70) discusses also other properties which may be used to classify cases 2. Among them are:

- synthetic vs. analytical cases: the former are realized via morphological means, the latter, e.g., as 'prepositions';
- primary vs. secondary cases (in languages which allow NPs to simultaneously bear multiple case markings).

In this study, we will deal solely with syntactic reflexes of case marking. This does not mean, however, that we deny that cases may have meanings, but only that we restrict ourselves to purely syntactic conditions on case assignment and case agreement, even when we deal with what seems to be a concrete case, using the terminology of Kuryłowicz (1948, 1949), as in Chapter 5, where we deal with the instrumental of predication (§5.4).

Moreover, we consider here only synthetic cases, i.e., we do not analyse 'case marking' prepositions; in fact, in Chapter 5 we assume (and, in passing, give some arguments for this assumption) that such 'case marking' prepositions in Polish are really prepositions, i.e., project to prepositional phrases (as opposed to being 'markers' or 'phrasal affixes' not altering the categorial status of the NP/AP they attach to).

Finally, since we limit our attention to languages which apparently do not allow case stacking, we do not consider the issue of primary vs. secondary cases.[6,7]

3.1.3 Decomposition of Cases

One particularly popular approach to classifying cases is that of Jakobson (1971a,b), so we will briefly discuss it here.[8]

[5]Admittedly, this is an oversimplification; see §3.2 for a more balanced view.

[6]Interestingly, if 'possessive' nominals in (3.1)–(3.2) were analysed as bearing a 'possessive' case, it would make sense to assume that, in the case of possessive pronouns, it is the primary case, with nominative, dative, etc., which result from agreement with the head, having here secondary uses.

[7]See Malouf (1999a) for a first attempt at analysing case stacking in HPSG.

[8]As discussed in Blake (1994, pp.38–39), a similar approach is also present in Hjemslev (1935).

Jakobson (1971a,b) assumes that each case has a 'general' (or 'intensional') meaning (his *Gesamtbedeutung*) and, moreover, that these general meanings may be decomposed into three binary oppositions, involving three semantic features. The meanings of these 'semantic marks' are given below (after Franks (1995, pp.42ff.)).

- [±quantified] (sometimes called 'quantifying'): focuses "upon the extent to which the entity takes part in the message";
- [±directional] (or 'ascriptive'): signalizes "the goal of an event";
- [±marginal] (or 'peripheral'): assigns "to the entity an accessory place in the message".

According to Jakobson (1971b), Russian cases are the following feature complexes:[9]

	marginal	quantified	directional
nominative	−	−	−
accusative	−	−	+
partitive	−	+	−
genitive	−	+	+
instrumental	+	−	−
dative	+	−	+
locative2	+	+	−
locative1	+	+	+

Table 3.1: Jakobson's decomposition of Russian cases

Jakobson (1971a,b) argued that there is additional phonological and morphological evidence for such decomposition of cases, e.g., cases differing only in the value of one feature often show syncretisms of forms for some classes of nominals, i.e., such syncretisms can be elegantly stated in this 'decompositional' system in terms of neutralization of oppositions.

This approach to classification of cases turned out to be very stimulating; similar decompositional analyses were adopted in works within different linguistic theories, e.g., in an LFG account of Russian case in Neidle (1982, 1988), and in a GB work of Franks (1995).

Nevertheless, we will not follow this tendency here, and this for a number of reasons.

First, decomposition of cases such as that in Table 3.1 is usually motivated on purely semantic and/or purely morpho(no)logical grounds. Since in this study we deal solely with syntactic aspects of case systems, developing such a 'decompositional' classification for a given language, even as related to Russian as Polish, would lead us too far afield.

Second, the approach of Jakobson (1971a,b) is far from being uncontroversial and, indeed, it has been criticised on various grounds. For one thing, as noted by Wierzbicka (1980, p.xv), the invariant meanings attributed by Jakobson (1971a,b) to various cases are rather nebulous, i.e., their predictive power is very limited. In this respect, we view as much more promising the approach of Wierzbicka (1980, 1981, 1983, 1986), according to which "a case has one

[9] 'Partitive' is often called 'genitive2' (Neidle, 1988; Franks, 1995).

core meaning, on the basis of which it can be identified cross-linguistically (as, say, 'dative' or 'instrumental'), and a language-specific set of other, related meanings, which have to be specified in the grammatical description of a given language" (Wierzbicka, 1986, p.386).

Moreover, as noted by Franks (1995, p.44), there are, both, identical meanings expressed by different cases (cf. Russian (3.3) from Franks (1995, p.44)), and drastically different meanings expressed by the same case (cf. (3.4), also from Franks (1995, p.40), drawn from Jakobson (1971b)), so that it is dubious that any general correspondence between morphological cases and meanings expressed by nominals will ever be found.

(3.3) a. pro knigu
about book$_{acc}$
'about (a/the) book'

b. o knigie
about book$_{loc}$
'about (a/the) book'

(3.4) On el ikru rebënkom / pudami / ložkoj / dorogoj / utrom / grešnym
he$_{nom}$ ate caviar$_{acc}$ child$_{ins}$ / pood$_{ins}$ / spoon$_{ins}$ / road$_{ins}$ / morning$_{ins}$ / sinful$_{ins}$
delom.
business$_{ins}$

'He ate caviar as a child / by the pood / with a spoon / on the road / in the morning / to our regret.'

Another problem with the decompositional analysis of Jakobson (1971a,b) is that, as argued by Franks (1995, pp.45–48) and Chvany (1986, p.110), on closer examination, the correlations between the values of case features 'marginal', 'quantified' and 'directional', and either phonological or morphological generalizations, is far from being as neat as Jakobson would have it. In particular, the account of morphological syncretisms based on neutralization of certain feature oppositions would predict many more possibilities of syncretisms than actually attested, but it still would not account straightforwardly for all syncretisms considered by Jakobson (1971a,b).

In view of these difficulties, Jakobson's *semantic* decompositional taxonomy is usually reinterpreted in subsequent linguistic literature in *morphosyntactic* terms (Neidle, 1982, 1988; Chvany, 1986; Franks, 1995), and his three-dimensional system is usually extended to more dimensions: 4 for Neidle (1988) and Franks (1995), 5 for Chvany (1986). The consequence of such an extension is that the elegant account of the 8 Russian cases considered by Jakobson (1971a,b) in terms of three fully orthogonal oppositions is lost and, consequently, the account loses much of its appeal.

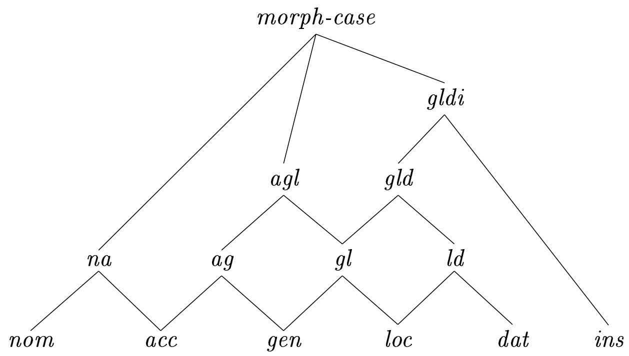
Further, since only some (and relatively few) of the potential syncretisms predicted by such decompositional approaches are attested, it makes sense to try to state the relevant generalizations in a more parsimonious way. In fact, HPSG provides a mechanism which is well-suited to stating such generalizations, namely a multiple-inheritance type hierarchy. For example, Franks (1995, p.46) strives to capture the following morphological syncretisms of various classes of nominals in Russian (dealt with by Jakobson):[10]

Syncretisms:							Examples:	
nom	=	acc					*okno*	'window'
acc	=	gen					*syna*	'son'
gen	=	loc					*zlyx*	'bad$_{pl}$'
loc	=	dat					*žene*	'wife'
acc	=	gen	=	loc			*nas*	'us'
gen	=	loc	=	dat			*noči*	'night
gen	=	loc	=	dat	=	ins	*sta*	'hundred'

Table 3.2: Russian case syncretisms

These syncretisms can be elegantly dealt with in HPSG by assuming the following hierarchy of morphological cases for Russian:

(3.5)



With this hierarchy in hand, e.g., *sta* 'hundred' may be lexically specified as bearing the case value *gldi*. Moreover, such a type hierarchy promotes, say, the set {*gen*, *loc*, *dat*} to the ontological status of a grammatical entity, namely, *gld*, but does not assign such a status to, say, {*loc*, *dat*, *ins*} (there is no type *ldi*). In contrast, on Jakobsonian approaches such as Neidle (1988) or Franks (1995), there is no sense in which the former set is grammatically more transparent or more important than the latter.[11]

In summary, although the approach to case devised by Jakobson (1971a,b) seems very appealing at first blush, we will not adopt it here both because it is concerned with issues that we will only touch upon (meaning of cases, morphological syncretism of cases), and because, apparently, whatever it gets right can be formalized with the help of type hierarchies, as used in HPSG, in a more adequate (and, in our view, more elegant) way.

[10]Together with Franks (1995), we ignore here the distinction between genitive and partitive, and between the two locatives.

[11]Incidentally, the type hierarchy (3.5) captures also another distinction mentioned in Jakobson (1971b), i.e., between direct cases (nominative and accusative; cf. *na* in (3.5)) and oblique cases (genitive, locative, dative and instrumental; cf. *gldi*). This distinction is important in some GB work on Slavic; see, e.g., the discussion of Babby (1980b,a) in §3.2.2 below.

3.2 Case in GB

Since our HPSG account of case assignment, to be developed in the next Chapter, takes over certain standard features of the GB approach to case, we will briefly discuss it here.

3.2.1 Standard GB

Within transformational linguistics, a theory of case (or, rather, 'Case', see below) was first developed in Rouveret and Vergnaud (1980), Vergnaud (1982) and Chomsky (1980, 1981), but the main idea is attributed to Jean-Roger Vergnaud.[12] According to this theory, all languages, whether they have morphological case or not, have 'abstract Case', spelled with capital 'C', which is assigned to nominal phrases by governing [−N] categories (i.e., by verbs and prepositions), as well as by the functional category of Tense (or Infl).[13] More specifically (Chomsky (1980, p.25), Chomsky (1986a, p.74)):

- NPs get the nominative Case when governed by Tense;
- NPs get the objective Case when governed by verbs;
- NPs get the oblique Case when governed by prepositions and certain ('marked') verbs.

The main principle of this Case module of GB is that which requires (roughly) all NPs to bear Case; it is known as the Case Filter, which is formulated as follows:[14]

(3.6) Every phonetically realized NP must be assigned (abstract) Case

This Case theory is held to be responsible for a number of facts, including the ones below:

(3.7) a. Mary persuaded John [PRO to leave].
b. Mary persuaded John [that she will leave].
c. *Mary persuaded John [she to leave].

(3.8) a. The rumour was widely believed.
b. It was widely believed that the rumour was true.
c. *It was widely believed the rumour.

In (3.7b), the downstairs subject *she* receives its case from the governing Tense (see *will*), while in (3.7a), where Tense is absent, this subject position is occupied by a covert ('empty') element PRO, which does not have to (cannot, on some approaches) bear Case. On the other hand,

[12] See, e.g., Chomsky (1986a, p.73), Lasnik (1992, p.381), Webelhuth (1995b, p.43), Chomsky and Lasnik (1995, p.111), Roberts (1997, p.57).

[13] Government is understood in GB in a technical way which is rather different than in traditional linguistics, but this does not matter here.

[14] This version of the Case Filter is taken from Chomsky (1986a, p.74).

(3.7c) is ungrammatical because this subject position is occupied by an overt NP, which—according to (3.6)—should have Case, but there is no governor which could assign it Case (in particular, there is no Tense). Similarly, on the assumption (later generalized to 'Burzio's generalization') that passive forms do not assign case,[15] (3.8a) is grammatical because the NP *the rumour* gets its Case from Tense,[16] (3.8b) is fine because the *that*-clause does not need Case (and *it* gets its nominative Case courtesy of Tense), while (3.8c) is ungrammatical because *the rumour* needs Case, which, however, the passive form *believed* is unable to assign.

This picture is modified in Chomsky (1986a) in a number of ways. Thus, while in the works published in the early 1980's cited above the only lexical elements able to assign Case were the [−N] categories (prepositions and verbs), in Chomsky (1986a) all lexical categories, including nouns and adjectives are potential Case-assigners. More specifically, Chomsky (1986a, p.193) distinguishes between 'structural' and 'inherent' Cases, to which he ascribes the following properties:

- 'structural' Cases:
  - assigned at S-structure;
  - assigned by verbs and finite Infl (Tense);
  - realized as objective and nominative;
- 'inherent' Cases:
  - assigned at D-structure;
  - assigned by prepositions,[17] nouns and adjectives;
  - realized as oblique (assigned by prepositions) and genitive (assigned by nouns and adjectives).

Another important distinction between 'structural' and 'inherent' Case assignment is that "inherent Case is assigned by α to NP if and only if α θ-marks NP, while structural Case is assigned independently of θ-marking."

This last statement is clearly false as it would directly predict that verbs never assign a θ-role to an NP, so it should be substituted by the statement on the next page (Chomsky, 1986a, p.194):

(3.9) If α is an inherent Case-maker, then α Case-marks NP if and only if [it] θ-marks the chain headed by NP.

Without explaining the technical notions of *chain* and *Case marking*, let us just note that the intuition behind this principle seems to be that, once a lexical item is in principle able to

[15]This assumption, and apparently also Burzio's generalization, are invalidated by so-called *-no*/*-to* constructions in Ukrainian and Polish; see Sobin (1985), Borsley (1988), and the admirably comprehensive bibliography collected in Billings and Maling (1995a,b).

[16]In the GB terminology, this NP 'must move to the subject position in order to be assigned Case'.

[17]Later, Chomsky (1986a, p.202) is forced to assume that, in English, prepositions assign a 'structural' Case, i.e., objective.

assign 'inherent' Case, it does so exactly to the NPs to which it assigns a θ-role. Thanks to this revision, verbs may assign 'structural' Case to their objects even though they also assign them a θ-role.[18]

Unfortunately, not much more is said about this 'Case theory' in Chomsky (1986a), and, in particular, important issues concerning the structural/inherent Case dichotomy are left unanswered (and often unasked). The most important of these is perhaps: Why should verbs be the only lexical categories assigning the 'structural' Case, and why should nouns and adjectives always assign the 'inherent' Case? Or, more generally, what are the empirical, as opposed to purely theory-internal, reflexes of this structural vs. inherent distinction?

These questions are addressed in GB works dealing with languages in which 'Case' is realized morphologically. We will look at works dealing with case in Slavic in the next subsection; here, we will consider only one other case in point, i.e., Haider (1985).

Haider (1985) attempts to make a link between abstract Case and morphological case in German by relating the 'structurality' of a given morphological case to its instability in changing syntactic environments:[19]

> The distribution of case in German allows insight into a basic difference: there are morphological case forms which alternate on the basis of structural context and others which do not, i.e., they are rigid. This difference can be accounted for in a straightforward manner if we assume that the alternating Cases are realized in specific structural environments whereas the rigid ones are independently determined; in other words, we will assume two sorts of case indices, *structural* and *lexical.*
>
> (Haider, 1985, p.70)

On the basis of these 'definitional' properties of structural and lexical Cases, Haider (1985, p.70) shows that, just as assumed by Chomsky (1986a), nominative and objective are structural cases: they may change as the result of passivization (accusative to nominative) or raising to object (AcI; nominative to accusative). However, implicitly departing from the assumptions of Chomsky (1986a), Haider (1985) also shows that in German certain verbs may assign the lexical Case, morphologically realized as dative or genitive (they are stable in passivization; see the data in §3.4.2 below). Additionally, Haider (1985, pp.80–81) assumes (against Chomsky's (1986a) views again) that ad-nominal genitive may be considered structural.[20,21] These results allow Haider (1985) to derive various GB principles (EPP, Burzio's Generalization), to the extent to which they are valid in German, and explain interesting properties of German passives, among other phenomena.

[18] In the interest of brevity, we do not discuss here the attempt at making the Case theory an auxiliary part (or consequence) of the θ-theory (in terms of Case marking being simply a 'visibility condition' on θ-assignment), however interesting this attempt is from a purely poetic point of view; see Chomsky (1986a, p.95 and, esp., n.39 on p.208).

[19] Note that Haider (1985) calls 'lexical' what Chomsky (1986a) calls 'inherent'. In the remainder of this study, we will use both terms interchangeably. Moreover, from now on we will drop the quotes in 'structural' and 'inherent'/'lexical'.

[20] Moreover, Haider (1985, pp.80–81) suggests that adjunct NPs are assigned Case on the basis of their thematic function, apparently outside the structural/lexical system, which is valid only for arguments.

[21] A similar set of conclusions is reached, in a rather different set of assumptions, in Yip *et al.* (1987) (on the basis of mainly Icelandic data).

It is roughly this understanding of the structural vs. inherent dichotomy, based on the (in)stability of morphological cases in changing environments, rather than that of Chomsky (1986a), which is based on the ability of various lexical items to take arguments and certain theory-internal considerations, that was adopted in the HPSG literature discussed below (§3.4.2). Moreover, as we show in Chapter 5 (cf. §5.1), such a case dichotomy plays an important rôle also in Polish.

Before we conclude this subsection,[22] a very brief note on more current versions of Chomsky's transformational grammar, i.e., the so-called Minimalist Program (MP; cf. Chomsky (1995c)), is in order. In these recent 'developments', Case theory is a part of the main explanatory mechanism, namely checking theory; items move in order to check matching features of functional heads. Among these features are Case features (now called 'N features'). Thus, for example, a nominative NP (or DP) which is in a VP-internal position must raise to the functional node Tense (or AgrS) in order to check its (Tense's!) nominative Case feature; otherwise 'the derivation crashes'. Similarly for the accusative NP: it must raise to the AgrO (Object Agreement) functional node in order to check AgrO's accusative 'N feature'. But how do these VP-internal NPs bear Case features in the first place? In general (and very roughly), any NP may bear any Case, but if, say, there are two nominative NPs and no accusative NP, then the N feature of AgrO cannot be checked and the derivation crashes. So, only those derivations will survive which had the right number of NPs with the right Cases to start with.

Although the above paragraph only scratches the surface, and probably is incomprehensible to anybody not already exposed to MP, it should be clear that, within MP, Case is an even more abstract notion than in GB, without any obvious connection to morphological case. What is important to us, though, is that—to the best of our knowledge—the structural vs. inherent dichotomy did not make it to MP; in fact, as noted in Roberts (1997, p.97), "it is not clear how inherent Case fits into the checking theory" at all.[23] For these reasons, we will ignore MP in the rest of this Part.

3.2.2 Slavic GB

As far as GB work on case is concerned, it may well be that most of it is based on Slavic data; it is rather telling that when Chomsky and Lasnik (1995, p.110) mention that there is "some parametric and lexical variation" to their generalization that "[i]n nominative/accusative languages, the subject of a finite clause is assigned *nominative* Case; the object of a transitive verb is assigned *accusative* Case," they cite Freidin and Babby (1984) and Neidle (1988), both concerned with case in Russian.[24] In fact, the literature is so voluminous, that we cannot

[22] See Webelhuth (1995b) and Roberts (1997, ch.2) for more comprehensive, and very readable, expositions to Case in GB/MP.

[23] But see Lasnik (1995) and Stjepanović (1997) for some discussion of inherent Case in MP, which leads to the conclusion that the only difference between structural Cases and inherent Cases is in terms of θ-role assignment. Unfortunately, it is not at all clear that phenomena successfully analysed on the basis of previous understandings of this dichotomy are still analyseable when this new minimalist approach is adopted, nor is an attempt made to show that this is the case. (See, however, Franks (1998b) for an attempt at reformulating his earlier GB analysis of case assignment into the MP set of assumptions. Unfortunately, this attempt is largely speculative.)

[24] Of course, Neidle (1988) is set within LFG; this seems to be one of the few exceptions to the general rule of "no cross-theoretical citations" usually adopted in GB/MP literature, especially, in Chomsky's own writings.

hope to do it any justice here; we will be content with a brief look at just a few works among those relevant to this study.

It is interesting that a dichotomy very similar to the structural vs. inherent distinction postulated in Chomsky (1980, 1986a) was independently developed within Slavic generative linguistics, namely, in Babby (1980b,a). In particular, Babby (1980b,a), concerned with case marking in Russian, distinguishes (after Jakobson (1971b)) between the direct cases (nominative and accusative) and the oblique cases (dative, genitive, locative, instrumental), and shows that this distinction is syntactically relevant in that indefinite NPs bearing the former, but not the latter, 'change' their case to genitive in Russian in the scope of negation. Babby (1980b) accounts for that by assuming that direct cases are assigned only structurally, on the basis of the position of an NP (i.e., at S-structure in standard GB terms), while oblique cases are assigned either 'by transformations' (at S-structure), or lexically (at D-structure). In case of indefinite NPs in direct positions, they are syntactically assigned the genitive case apparently before the relevant rule configurationally assigning the nominative or the accusative has a chance to operate, but clearly after the lexical assignment of oblique cases (because oblique NPs cannot 'change' their case to genitive in the scope of negation). This distinction between direct and oblique cases is both similar to standard GB assumptions discussed above, in that direct (= structural) case is assigned only in the syntax proper, and different from them, in that oblique (= inherent) case is assigned either lexically, or syntactically.

However, Babby's (1980b) approach is more spelled out than the theories of Case sketched above. Babby (1980b) assumes a number of mechanisms, which we will illustrate with an outline of his account of Russian numeral phrases.[25] The striking property of Russian (or Polish) numeral phrases is that, if such a phrase occurs in a direct position, the noun must bear the genitive case, while in oblique positions, it bears the oblique case assigned to the whole phrase. This is illustrated below (on the basis of Babby (1980b, (14), p.13); instrumental represents oblique cases here, while nominative and accusative are direct cases).

(3.10) a. $\mathrm{NP}_{nom/acc}$ [*pjat'* 'five$_{nom/acc}$'] [*knig* 'books$_{gen}$']

b. NP_{ins} [*pjat'ju* 'five$_{ins}$'] [*knigami* 'books$_{ins}$']

According to Babby (1980b), such data strikingly confirm his understanding of the distinction between direct and oblique cases. On the assumption that, in Russian, there is a transformational rule that marks NPs in the scope of quantifiers (including numerals) as genitive, the facts in (3.10) are predicted: assuming the cyclicity of case assignment rules ('transformations'), in (3.10a), the rule assigning genitive in the scope of quantification will apply to the noun *knig* before the rule assigning the nominative/accusative will apply to the whole NP; this means that the nom/acc case will be able to percolate to the numeral, but not to the noun, because it will already bear case. On the other hand, in (3.10b), the instrumental must be assigned lexically, i.e., before any transformations; this means that the 'genitive of quantification' rule will not apply because the noun already bears case.

This account illustrates the following properties of case marking assumed by Babby (1980b):

[25] Similar data in Polish will be extensively discussed in Chapter 5 (§5.3).

- case may be assigned only once; once it is assigned no rule is capable of re-assigning it;
- in cases of case assignment conflicts, the case that was assigned first wins;
- case percolates from maximal projections to all elements of these projections, but:
- case percolation is stopped if an element already bears case (assigned lexically or in an earlier cycle).

An approach to case along similar lines is also assumed in Babby (1985).

However, this view is substantially modified in Babby (1986), who still assumes the distinction between direct morphological cases (nominative, accusative) and oblique cases (genitive, dative, etc.), but ascribes different properties to them:[26]

- direct cases are assigned to maximal NP projections, while oblique cases are assigned to head nouns;
- an exception to the last generalization is the genitive (hence, oblique) of quantification ('GEN(QP)'), which is assigned to N′, i.e., neither to a maximal projection, nor to the lexical head;
- case assigned to a maximal projection percolates downwards to all appropriate constituents, case assigned to lexical heads percolates upwards all the way to the maximal projection (or, roughly, to the position from which this case was assigned, if lower than maximal projection);
- direct cases are assigned configurationally, while oblique cases are assigned:[27]
  - either lexically,
  - or semantically, e.g., the genitive of negation,
  - or via the rule responsible for the genitive of quantification;
- when conflicts between these various modes of case assignment arise, they are resolved according to the following CASE ASSIGNMENT HIERARCHY for Russian:

  Lexical Case > Semantic Case > GEN(QP) > Configurational Case

Moreover, Babby (1986) assumes that case may be assigned either by a head (Lexical Case), or by a maximal projection (genitive of quantification, assigned by QP). Thus, the analysis of Russian case assignment in Babby (1986) involves rather heavy machinery, much of it not quite standard in GB (e.g., case assignment by maximal projections or case assignment to heads, i.e., not under government). Many of these assumptions are also present in Babby (1987, 1988), with the prominent exception of case assignment to heads; Babby (1987, 1988) assumes that lexical case (and, probably, oblique cases in general) is assigned to maximal

[26] See also Freidin and Babby (1984) and Babby (1984).

[27] Babby (1986, n.27, p.214) tentatively adopts a fourth possibility, of an oblique case being assigned configurationally, namely in case of ad-nominal genitive. This weakens the syntactic relevance of the direct vs. oblique case distinction.

projections, just as configurational case (but case assignment to non-maximal projections, by QP, is still allowed).[28]

It seems fair to say that Babby's work on case in Russian was a first attempt at giving a comprehensive generative account of syntactic (and, to a lesser extent, semantic) case assignment in a Slavic language, but interesting GB work on Slavic case certainly is not limited to his oeuvre. Among other interesting positions are the following:[29]

- Pesetsky (1982): provides an analysis of the genitive of negation and case patterns in quantificational NPs/QPs in Russian;
- Franks (1983): deals with the difficult issue of relationship between case and control in Polish (see §5.4.2.1 for a brief discussion);
- Franks (1986): concerned with quantifier structures in Russian, as Babby, but mainly with empty and prepositional quantifiers;
- Rappaport (1986a): tackles with case assignment in comparative and (secondary) predicative constructions in Russian;
- Franks and Greeneberg (1988) and Franks (1990): discuss configurational assignment of the dative case in Russian;
- Leko (1989): an analysis of case assignment in Serbo-Croatian based on the assumptions that abstract Case is assigned by heads (i.e., 0-projections) to maximal projections under government, case percolation is only downward (to heads), and there is a separate mechanism of 'Case spreading' responsible for case agreement;
- Franks (1994b,a): deals with numeral (quantificational) phrases in Russian and Serbo-Croatian, and, to a much lesser extent, Polish;
- Franks (1995): a collection and some extension of the analyses in his previous work;
- Bailyn (1995): on the basis of Russian data, extends configurational case assignment to many instances of oblique cases, hitherto analysed as assigned lexically or semantically, by associating different morphological cases with different configurational positions.[30]

What all these works, and, indeed, all works discussed in this section, have in common is the assumption that syntactic case is a *configurational* phenomenon, i.e., that case, or at least the structural / configurational / direct case is assigned to an NP on the basis of its configurational

[28] Another simplification in Babby (1987, 1988) with respect to Babby (1986) is (tentative) classification of GEN(QP) as configurational, with the resulting simplification of the CASE ASSIGNMENT HIERARCHY to: *Lexical Case > Semantic Case > Configurational Case*.

[29] Our failure to include a publication in the list below should by no means be interpreted as an attempt to depreciate it; some apparently interesting works have not been available to us at the time of writing (e.g., Freidin and Babby (1984), Franks (1985), Fowler (1987) and Bailyn and Rubin (1991)), other will be briefly discussed in Chapter 5, on case in Polish (esp., Willim (1990) and Tajsner (1990)) and in the next Part of this study, on complements and adjuncts (e.g., Franks and Dziwirek (1993) and Fowler and Yadroff (1993)).

[30] However, the difference between 'structural' and 'lexical' cases in preserved in that the former are assigned at a Spec position, while the latter at a Complement (sister of a 0-projection) position.

position.[31] The approach to case assignment developed in Chapter 4 and extensively applied to Polish in Chapter 5 will be, by contrast, strictly *non-configurational*.

Another feature that the great majority of these works have in common is the distinction between structural cases, usually understood as assigned purely on the basis of syntactic configuration, and inherent or lexical cases, often assumed to be assigned by particular lexical items (or, otherwise, semantically), but different authors attach different assumptions to this dichotomy. In Chapter 5, we will show that some such distinction is valid for Polish, although our understanding (and technical execution) of it will be quite different than in any of these works.

3.3 Case in LFG

Before we move to the discussion of case assignment in HPSG, a note on case assignment in LFG is in order as our analysis developed in Chapter 4 shares an important feature with LFG analyses, namely, (the possibility of) case assignment on the basis of the obliqueness (grammatical function) hierarchy.

The first clear account of case assignment in LFG that we are aware of is Neidle (1982),[32] who distinguishes between 'structural (predictable) case assignment' and 'lexical (irregular) case assignment'. The latter is, just as in the GB work discussed above, assigned obligatorily and idiosyncratically by particular lexical items, and no syntactic process may change it. For example, a verb may have the following information as part of its lexical entry:

(3.11) V, $(\uparrow \text{OBJ CASE} = \text{DAT})$

The former, on the other hand, is—contrary to the terminology—structural in a very weak sense; according to Neidle (1982), 'structural case assignment' takes place on the basis of grammatical functions of NPs. Technically, this idea is realized via a 'Phrase Structure (PS) redundancy rule' which says that, whenever there is a certain grammatical function specification on a phrase structure rule, e.g., (3.12), optionally add to it a relevant case specification, e.g., (3.13).

(3.12) $(\uparrow \text{OBJ}) = \downarrow$

(3.13) $(\downarrow \text{CASE}) = \text{ACC}$

The result of this is that, given the rule such as (3.14), objects of verbs will be optionally assigned the accusative case.

(3.14) $$\begin{array}{cccc} \text{VP} \rightarrow & \text{V} & \text{NP} & \text{NP} \\ & & (\uparrow\text{OBJ})=\downarrow & (\uparrow\text{OBJ2})=\downarrow \end{array}$$

[31] But see Schoorlemmer (1994) for a (partially) opposite claim, i.e., for the analysis of dative in Russian, configurational according to Franks and Greeneberg (1988) and Franks (1990), as semantic, assigned freely "to any NP that needs it."

[32] See also Andrews (1982) for a somewhat more complicated account of case in Icelandic and, especially, its interaction with control. The main assumptions of Neidle (1982) regarding case in LFG are also present in Neidle (1988).

Now, if a verb assigns case to its object lexically, as in (3.11), this optional 'structural case assignment' rule will not apply because one feature (here, CASE) cannot have two values (LFG's principle of consistency). On the other hand, if a verb does not assign a lexical case, the rule may apply, and, if it does, the object will be in the (default) accusative case.

Since this rule is optional, it does not have to apply, though. If it does not, then this NP will not have its CASE value specified. This, however, is forbidden because, by assumption, all lexical nominal items must contain a *constraint* equation, such as the one below, for the Russian pronoun *ja* 'I_{nom}':

(3.15) *ja*: PRO, $(\uparrow\text{CASE}) =_c \text{NOM}$

What this constraint equation says is that *ja* must be assigned the nominative case, whether by a lexical entry of a verb, or by a PS redundancy rule. So, such constraint equations play the rôle analogous to that of the Case Filter in GB, forcing nominals to be assigned case.[33]

Despite the apparent similarity of this approach to those in GB, important differences should be noted. First, although 'structural' case is directly assigned via an annotation on a syntactic rule, and in this sense it is (weakly) structural or configurational, such an annotation is added (via PS redundancy rules) on the basis of the grammatical function, and in this sense 'structural' case assignment is really 'functional'. Second, Neidle (1982) does not assume that structurally assignable cases are limited to nominative and accusative; on the contrary, she presents rules of structural case assignment of the instrumental of predication, the dative of secondary objects, and the genitive of negation (all in Russian).[34]

Another interesting LFG analysis of case assignment is that of Zaenen and Maling (1983) and Zaenen *et al.* (1985), who distinguish between three different modes of case assignment, adding (after Freidin and Babby (1984)) semantic case assignment to the two types of case assignment considered by Neidle (1982). Although Zaenen and Maling (1983) and Zaenen *et al.* (1985) do not have anything to say about the semantic case, apart from giving examples involving the accusative of time/duration and the dative of instrument (in Icelandic), they make certain additional assumptions regarding the other two types of case assignment. In particular, they assume that lexical (idiosyncratic) case is assigned to particular thematic roles (note the similarity with GB assumptions), while structural (functional) case is assigned at the level of grammatical functions by the following default rule:

(3.16) DEFAULT CASE MARKING (Universal):

> The highest available Grammatical Function is assigned NOM case, the next highest ACC.

A Grammatical Function (GF) is considered to be available if it is not already[35] assigned a lexical case.

[33]On the other hand, they seem to lack the generality of the Case Filter in the sense that there is no meta-constraint to the effect that *all* lexical entries of nominals must involve such a constraint equation. Andrews (1982) takes advantage of this feature in analysing Icelandic nominative NPs as actually caseless.

[34]In this sense, this approach shows strong affinity with that of Bailyn (1995), despite theoretical differences.

[35]Zaenen and Maling (1983) and Zaenen *et al.* (1985) assume certain order in which various principles should be satisfied, which seems at odds with LFG as an interpretive theory. We are not sure whether this is really intended, or whether it is for expository reasons only.

This rule presupposes a hierarchy of grammatical functions, universal according to Zaenen and Maling (1983, p.176), namely:

(3.17) SUBJ > OBJ > OBJ2

The important difference between this analysis and that of Neidle (1982, 1988) is that, while on the latter account 'structural' case was assigned to *particular* grammatical functions, here it is assigned on the basis of the *hierarchy* of grammatical functions. For example, the principle (3.16) together with the hierarchy in (3.17) predicts that nominative case is assigned to the subject, *unless* this subject already bears a lexical case; in that case, nominative case is assigned to the object.

This analysis is strikingly confirmed by Icelandic ditransitive verbs. In brief, such verbs take three arguments: the nominative subject, the accusative object and the dative indirect object. In Icelandic, either object may become the subject in passive constructions. Thus, in case indirect object becomes the subject, the direct object is the highest 'available' GF (the subject is earlier lexically marked as dative), so, according to (3.16), it should bear the nominative case. See Zaenen and Maling (1983) and/or Zaenen *et al.* (1985) for the data confirming this prediction.

Such reliance of the rules of 'structural' case assignment on the *hierarchy* of grammatical functions will also be an important feature of our account, developed in Chapter 4.

Finally, a more recent and very clear presentation of ways case is assigned in LFG can be found in King (1995, §8.1), where four modes of case assignment are considered:[36]

- functional, based on particular grammatical functions, as in Neidle (1982, 1988);
- lexical, completely idiosyncratic, assigned by particular lexical items;
- semantic, predictable on the basis of semantic information;
- configurational, assigned on the basis of c-structure position.

The first two kinds of case assignment are assumed throughout the LFG literature, including the works cited above. The third kind, i.e., semantic case assignment, has been assumed and/or argued for mainly on the basis of various non-European languages, e.g., Hindi (Mohanan, 1994), Urdu (Butt, 1995; Butt and King, 1991, 1999), Warlpiri (Simpson, 1991), and other Australian languages (Nordlinger, 1998), but, e.g., also various adverbial NPs in European languages have been claimed to bear semantic cases. In this study, we will not deal with this mode of case assignment; we will use the term 'inherent/lexical case' as encompassing both truly idiosyncratic lexical case and semantically predictable case.

Finally, King (1995) introduces into LFG purely configurational case, assigned to an NP solely on the basis of the position this NP has in the syntactic tree (c-structure), although she assigns it only a very marginal rôle, unlike in GB or MP. An example that she gives comes from external topicalization in Russian:[37]

[36] This four-way distinction is further elaborated in Butt and King (1999), on the basis of Urdu.
[37] This example is attributed to Franks and House (1982, p.161).

(3.18) [Milicionery], [na stole ležalo dve furažki.]
policemen$_{nom}$ on table lay two service caps
'(As for) policemen, on the table lay two service caps.'

Since King (1995) provides a configurational analysis of topic and focus in Russian, in which different information structure functions are associated with different tree-structure positions, it is natural for her to claim that the nominative case on the external topic *milicionery* is tied to the configurational position of such external topics.

The approach to case assignment developed in Chapters 4 and 5 implicitly rejects such claims, although, unfortunately, information-structural considerations are outside the scope of this study and, hence, we do not provide an alternative analysis of external topicalization.[38]

We now move to the presentation of HPSG approaches to case assignment.

3.4 Case in HPSG

Pollard and Sag (1994, p.30) say that in HPSG, "[t]here is no separate theory of case (or Case). Nominative case assignment takes place directly within the lexical entry of the finite verb," while "the subject SUBCAT element of a nonfinite verb... does not have a CASE value specified."

However, they add in a footnote (Pollard and Sag, 1994, fn.25, p.30), that "for languages with more complex case systems, some sort of distinction analogous to the one characterized in GB work as 'inherent' vs. 'structural' is required."

In fact, all HPSG accounts of various case phenomena from various languages assume such a distinction. Below, we will briefly examine HPSG accounts of case assignment, and we will see that these approaches share with GB configurationality of case assignment rules.

3.4.1 Sag *et al.* (1992)

The first interesting HPSG approach to case assignment is that of Sag *et al.* (1992).[39] It is concerned with the famous problem of so-called 'quirky' subjects in Icelandic (Andrews, 1982, 1990; Zaenen and Maling, 1983; Zaenen *et al.*, 1985), in which non-nominative subjects of some verbs retain their 'quirky' case in raising constructions instead of showing up in the nominative (raising to subject) or in the accusative (raising to object) case. This is illustrated by the contrast between (3.19), where non-quirky subjects are involved, and (3.20)–(3.22) with 'quirky' (accusative, dative and genitive) cases on the subject of the lower verb.

(3.19) a. **Hann** virðist elska hana.
he$_{nom}$ seems love$_{inf}$ her$_{acc}$

[38]However, it seems that the nominative on external topics should be linked to the nominative as the 'extrasentential' case, i.e., used to mark NPs not present on any argument structure. We leave exploring this possibility for future research.

[39]A similar approach to case assignment can be found in Zlatić (1997b), which came to our attention too late to be discussed here.

‘He seems to love her.’

b. Þeir telja **Maríu** hafa skrifað ritgerðina.
they believe Mary$_{acc}$ have$_{inf}$ written the-thesis
‘They believe Mary to have written her thesis.’

(3.20) a. **Hana** virðist vanta peninga.
her$_{acc}$ seems lack$_{inf}$ money
‘She seems to lack money.’

b. Hann telur **mig** vanta peninga.
he$_{nom}$ believes me$_{acc}$ lack$_{inf}$ money
‘He believes that I lack money.’

(3.21) a. **Barninu** virðist hafa batnað veikin.
the-child$_{dat}$ seems have$_{inf}$ recovered-from the-disease
‘The child seems to have recovered from the disease.’

b. Hann telur **barninu** hafa batnað veikin.
he believes the-child$_{dat}$ have$_{inf}$ recovered-from the-disease
‘He believes the child to have recovered from the disease.’

(3.22) a. **Verkjanna** virðist ekki gæta.
the-pains$_{gen}$ seems not be-noticeable$_{inf}$
‘The pains don’t seem to be noticeable.’

b. Hann telur **verkjanna** ekki gæta.
he believes the-pains$_{gen}$ not be-noticeable$_{inf}$
‘He believes the pains to be not noticeable.’

Such facts are problematic for the simplistic assumption that case is assigned directly within lexical entries because it is not clear what case should be assigned to the subject of the subject-raising verb *virðist* ‘seem’: as (3.20)–(3.22) show, it cannot be nominative. It could be claimed that the case of the subject of *virðist* ‘seems’ is the same as the case of the subject of the lower verb would be, if it were a matrix verb, but the same cannot be said about the case of the object of object-raising verbs such as *telur* ‘believes’. Here, the case is the same as if it were assigned by the lower verb only if the lower verb assigns a ‘quirky’ case to its subject, as in (3.20)–(3.22). In (3.19), on the other hand, the case of the raised object is accusative, instead of the nominative expected on such a straightforward analysis.

The pretheoretic generalization concerning Icelandic case facts seems to be that, by default, subjects of finite verbs get the nominative case and objects get the accusative, but these default values can be overridden by particular verbs which assign particular ‘quirky’ cases to their subjects. Sag *et al.*’s (1992) aim is to encode this non-monotonic intuition using monotonic mechanisms provided by HPSG. They introduce two case features, CASE (the actual case), and DCASE (default case), and assume that ‘non-quirky arguments’ structure-share the values of these attributes, while ‘quirky arguments’ are lexically assigned the value of CASE, but not of DCASE. Moreover, overtly realized subjects are assigned the nominative DCASE, and raised objects are assigned the accusative DCASE.

Now, assuming that the morphological case corresponds to CASE, the problematic facts above are accounted for. In (3.19), the subject of the lower verb is not ‘quirky’, i.e., it shares its

CASE with its DCASE. When this subject is raised and realized as the subject of the higher verb, as in (3.19a), its DCASE (and, hence, also its CASE) is resolved to the nominative, but when it is raised to object, its DCASE (and CASE) is resolved to the accusative case. On the other hand, subjects of the lower verbs in (3.20)–(3.22) do not structure-share their DCASE and CASE but, instead, have their CASE value specified lexically. This means that, whatever the value of DCASE, their morphological case is constant.

Two features of this account should be noted. First, it implicitly introduces into HPSG the structural/lexical case dichotomy assumed in other frameworks. Here, an argument of a verb bears a structural case in the sense that it is lexically specified as sharing its CASE and DCASE, with the particular value of these attributes being assigned by more general principles. An argument bears a lexical case, on the other hand, if its CASE value is lexically specified.

The second feature is the partial configurationality of structural case assignment. Since the structural nominative is assigned to overtly realized subjects, the relevant case assignment principle (not formalized in Sag *et al.* (1992)) must operate on the level of DTRS or, equivalently, should be incorporated into phrase structure schemata.

This brings us to certain conceptual problems with the case assignment account of Sag *et al.* (1992). First, on that account, assignment of structural case is heterogeneous. In case of structural nominative, it is done in grammar proper: "it is a general fact about realized subjects in Icelandic... that their default case value is nominative. This information is presumably to be associated with the grammar rule that introduces subjects" (Sag *et al.*, 1992, p.310). In case of structural accusative, on the other hand, case assignment takes place directly within lexical entries. Sag *et al.* (1992, p.311) give the following example of the SUBCAT specifications for object raising verbs (their (31)):

(3.23) $$\left[\textsc{subcat}\ \left\langle \left[\textsc{cat}\ \textit{np}\right], \boxed{1}\begin{bmatrix}\textsc{cat} & \textit{np}\\ \textsc{dcase} & \textit{acc}\end{bmatrix}, \begin{bmatrix}\textsc{cat} & \textit{vp}\\ \textsc{form} & \textit{inf}\\ \textsc{subcat} & \langle\boxed{1}\rangle\end{bmatrix}\right\rangle\right]$$

This account may be satisfactory for the Icelandic facts considered by Sag *et al.* (1992), but, as we will see below, a more general analysis of structural case assignment is necessary in other languages, including German, Korean and Polish.

Another minor problem is that it is not clear what case value should be assigned to 'quirky' objects. If, by analogy with 'quirky' subjects, only the CASE value is specified in the lexical entry of the 'quirky' verb, then nothing specifies the value of DCASE and spurious ambiguities result (one analysis with DCASE nominative, another with DCASE accusative, assuming that these are the only possible values of DCASE). This spurious ambiguity problem can be dealt with by assigning the accusative to DCASE of all objects, but it is clear that, in case of 'quirky' objects, this value does not play any rôle in the grammar.

The accounts we move to now are more general and free from these problems.

3.4.2 Pollard (1994) and Heinz and Matiasek (1994)

The structural vs. lexical case distinction was explicitly introduced into HPSG apparently independently by Pollard (1994) and Heinz and Matiasek (1994).[40]

3.4.2.1 Pollard (1994)

Pollard (1994) uses this dichotomy in order to give a unified account of German passive. He follows GB in assuming that lexical case is assigned rather idiosyncratically by particular lexical items to their dependents, while structural case is assigned by general grammatical principles:

> [A] structural NP is simply an NP whose case is not lexically assigned, but instead will surface as either a nominative or an accusative, depending on the syntactic context in which it occurs.
>
> (Pollard, 1994, p.277)

Thus, for example, the participle *gegeben* 'given' has a (partial) lexical entry like in (3.24).

(3.24) *gegeben* 'given'

$$\begin{bmatrix} \textsc{head}\ \textit{verb}[\textit{part}] \\ \textsc{subj}\ \langle \text{NP}[\textit{str}] \rangle \\ \textsc{comps}\ \langle \text{NP}[\textit{str}],\ \text{NP}[\textit{dat}] \rangle \end{bmatrix}$$

The indirect object of *gegeben* is lexically assigned the dative case, but the subject and the direct object are assigned the underspecified (i.e., non-maximal) type *str*, which will be resolved in the syntax according to a principle such as (3.25) (Pollard, 1994, p.294):[41]

(3.25) STRUCTURAL PRINCIPLE OF STRUCTURAL CASE RESOLUTION

i. An NP[*str*] is assigned nominative case if its sign realization is as the subject of a phrase.

ii. An NP[*str*] is assigned accusative case if its sign realization is not as the subject of a phrase.

For example (Pollard, 1994, p.277), the direct object of *gegeben* is realized as the object of the participial phrase in (3.26a) and is assigned the accusative case in accordance with (3.25ii), but it is passivised and realized as the subject of the clause in (3.26b) and it is assigned the nominative by (3.25i).

[40] See Pollard (1994, fn.23, p.294) and Yoo (1993, p.188). Heinz and Matiasek (1994, p.202) mention Kiss (1991) as using "*str(uctural)* and *lex(ical)* without further explanation."

[41] Pollard (1994, pp.293–294) also briefly considers an alternative formalization using defaults, a mechanism not available at the moment in the logic for HPSG which we assume here (King, 1989, 1994, 1999; Richter *et al.*, 1999; Richter, 1999b).

(3.26) a. Sie hat ihm **den Wagen** gegeben.
she$_{nom}$ Aux he$_{dat}$ the$_{acc}$ car given
'She gave him the car.'

b. **Der Wagen** ist ihm gegeben worden.
the$_{nom}$ car Aux he$_{dat}$ given Aux
'The car was given to him.'

An interesting application of this case assignment technique, which also seems to provide an argument for configurationality of case assignment, is so-called remote passive, as in (3.27b) below (Pollard, 1994, p.288).

(3.27) a. [**Den Wagen** zu reparieren] wurde versucht.
the$_{acc}$ car to fix Aux tried
'It was attempted to fix the car.'

b. [Zu reparieren versucht] wurde **der Wagen** lange Zeit.
to fix tried Aux the$_{nom}$ car long time
'It was attempted to fix the car for a long time.'

On the common assumption that only single constituents can be fronted (i.e., can appear before the finite verb in so-called V2 clauses, as these in (3.27)), *versuchen* 'attempt' is analysed as optionally attracting arguments of its complement, in the sense of Hinrichs and Nakazawa (1990, 1994a). In (3.27a), *versucht* does not attract the complements of the infinitival verb it subcategorizes for (here, *zu reparieren*), so *den Wagen* is realized as the direct object of *reparieren* and the whole infinitival VP *den Wagen zu reparieren* is passivised (raised to the subject position of the auxiliary *wurde*). On the other hand, (3.27b) involves the attraction version of *versuchen*: the object of *reparieren* becomes a complement of *versucht*, it is passivised, i.e., raised to the subject of *wurde*, and the participial VP *zu reparieren versucht* is fronted.[42] Similar analyses are proposed by Kiss (1991) and Heinz and Matiasek (1994).

If this analysis is essentially correct, it provides an argument against the strictly lexical approach to case assignment of Pollard and Sag (1994) and, apparently, for some rôle of configurationality in structural case assignment. The argument is as follows: assuming case assignment in the lexicon, what case should *reparieren* assign to its object? It cannot be the nominative, because the object bears the accusative case in (3.27a). It cannot be the accusative, either, because of the nominative case of *der Wagen* in (3.27b). Leaving the case of the object of *reparieren* unspecified in the hope that it will be resolved by a higher verb also would not work: *den Wagen* is clearly accusative in (3.27a), although it is not raised to a higher verb which could assign case to it.[43]

On the other hand, a configurational CASE RESOLUTION principle like that in (3.25) (or (3.36) below) deals with such cases easily: the complement of *reparieren* is accusative in (3.27a) because it is realized as the object of *reparieren* (cf. clause ii. of (3.25)), and it is nominative in (3.27b) because it is realized as the subject of *wurde* (cf. clause i. of (3.25)). In §4.2,

[42] See Pollard (1994) for details and §4.3.2 for an analysis assuming the approach to structural case assignment developed in the next Chapter.

[43] A moment's reflection should suffice to show that, even if *zu* were to be analysed as an argument attraction auxiliary, the argument above against purely lexical case assignment could be repeated for this auxiliary.

we will see that facts such as (3.27) can also be accounted for without any reference to configurationality.

3.4.2.2 Heinz and Matiasek (1994)

Heinz and Matiasek (1994) provide probably the best worked-out and the most influential account of case assignment in HPSG to-date. Building on earlier work within GB (Haider, 1985, 1986), they examine in detail the rôle of the structural/lexical case distinction in German. Similarly as Pollard (1994), they assume that an argument is assigned structural case if the morphological case value of this argument varies together with syntactic environment. This is illustrated by the contrast between (3.28) and (3.29) (Heinz and Matiasek, 1994).

(3.28) a. Der Mann unterstützt **den Installateur**.
the man$_{nom}$ supports the plumber$_{acc}$
'The man is supporting the plumber.'

b. **Der Installateur** wird unterstützt.
the plumber$_{nom}$ Aux supported
'The plumber is supported.'

c. das Unterstützen **des Installateurs**
the supporting the plumber$_{gen}$
'the support for/from the plumber'

(3.29) a. Der Mann hilft **dem Installateur**.
the man$_{nom}$ helps the plumber$_{dat}$
'The man is helping the plumber.'

b. **Dem Installateur** wird geholfen.
the plumber$_{dat}$ Aux helped
'The plumber is helped.'

c. das Helfen **des Installateurs**
the helping the plumber$_{gen}$
'the help from/*for the plumber'

In (3.28a), the direct object of the active *unterstützt* 'supports' bears the accusative case, but in the passive (3.28b), it bears the nominative, and in the deverbal NP (3.28b) it bears the genitive. On the other hand, the dative argument of the active (3.29a) stays dative in the passive (3.29b) and cannot occur in the genitive case in the deverbal NP (3.29c).

These observations might suggest that German morphological cases (nominative, accusative, genitive, dative) are neatly divided into structural cases (nominative, as in (3.28b), accusative, as in (3.28a), and genitive, as in (3.28c)), and lexical (dative, as in (3.29)). However, as examples (3.30) (from Heinz and Matiasek (1994, p.226) but attributed to Andreas Kathol) and (3.31) (from Haider (1985, p.68)) suggest, also accusative and genitive can be lexical.

(3.30) a. Der Professor lehrt **den Studenten** jede Woche einen neuen Ansatz.
the professor$_{nom}$ teaches the student$_{acc}$ every week a new approach$_{acc}$
'The professor teaches the student a new approach every week.'

b. ?**Den Studenten** wurde jede Woche ein neuer Ansatz gelehrt.
the student$_{acc}$ was every week a new approach$_{nom}$ taught
'A new approach was taught to the student every week.'

c. ***Der Student** wurde jede Woche einen neuen Ansatz gelehrt.
the student$_{nom}$ was every week a new approach$_{acc}$ taught
'A new approach was taught to the student every week.' (intended)

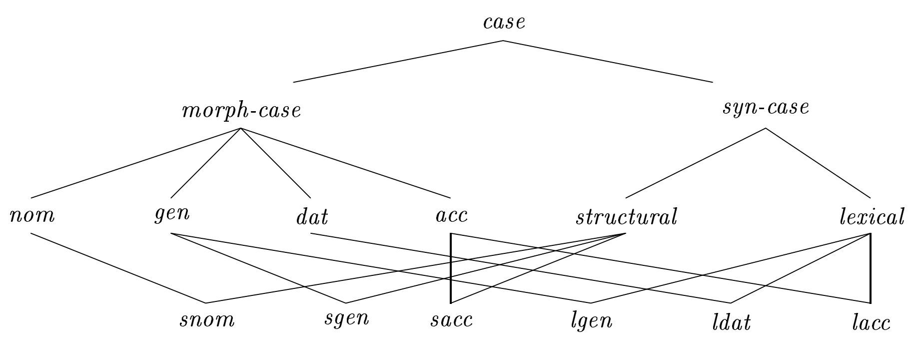
(3.31) a. Sie gedachte **vergangener Freuden**.
she remembered past joy$_{gen}$
'She remembered past joy.'

b. **Vergangener Freuden** wurde gedacht.
past joy$_{gen}$ was remembered
'Past joy was remembered.'

As examples (3.30b) and (3.30c) show, one of the two accusative complements of *lehren* 'teach' is lexical: it remains in the accusative case (cf. (3.30b)), instead of changing its case to the nominative (cf. (3.30c)). (3.31), on the other hand, shows that the genitive argument of *gedachte* 'remembered' is also lexical: it behaves like the dative argument of *hilft* 'helps' in (3.29), and not like the argument of *unterstützt* in (3.28).

On the basis of such considerations, Heinz and Matiasek (1994) assume that lexical cases can be morphologically realized as genitive, dative and accusative, while structural cases can be realized as nominative, genitive and accusative. This leads to the following case hierarchy for German:[44]

(3.32)



Now, since lexical cases are constant across syntactic environments, their morphological realization (e.g., *ldat*) is fixed in lexical entries of particular verbs and cannot be subsequently

[44] Case can also be made for lexical nominative in German, cf., e.g., Müller (1998a).

changed. On the other hand, since structural cases are morphologically resolved only in the syntax, they cannot be fixed in the lexicon; lexical entries should only specify that their arguments are structural (*str*), without specifying particular morphological realization (such as *snom*). This leads to the following difference between *unterstützen* 'support' and *helfen* 'help' in their subcategorization requirements (see also (3.24) above):

(3.33) a. *unterstützen*: [SUBCAT ⟨NP[*str*], NP[*str*]⟩]

b. *helfen*: [SUBCAT ⟨NP[*str*], NP[*ldat*]⟩]

Note that subjects of both verbs are analysed as structural. This is for at least two reasons. First, they change their case to genitive in nominalization, cf. (3.28c) above, repeated as (3.34a), and (3.34b).

(3.34) a. das Unterstützen **des Installateurs**
the supporting the plumber_{gen}
'the support from/for the plumber'

b. das Helfen **des Installateurs**
the helping the plumber_{gen}
'the help from the plumber'

Moreover, the case of the subject changes in so-called AcI constructions (also called *subject-to-object raising* and *ECM* constructions), as in (3.35b) (Heinz and Matiasek, 1994, p.231).

(3.35) a. **Der Mann** kommt.
the man_{nom} comes
'The man is coming.'

b. Die Frau sieht **den Mann** kommen.
the woman_{nom} sees the man_{acc} come
'The woman sees the man coming.'

The last, but not least, part of Heinz and Matiasek's (1994) approach deals with resolving *str* to particular morphological cases *snom*, *sgen*, *sacc*.

This is done via the CASE PRINCIPLE (3.36), with the notions *external argument* and *internal argument* defined in (3.37) and (3.38), respectively (Heinz and Matiasek, 1994, p.209).

(3.36) CASE PRINCIPLE (for German):

In a *head-complement-structure* whose head has category
verb[*fin*] the external argument has a CASE value of *snom*,
verb the internal argument has a CASE value of *sacc*,
noun the internal argument has a CASE value of *sgen*.
These are the only saturated or almost saturated *head-complement-structure*s with structural arguments.

(3.37) *Syntactically External Argument ('Subject')*:

If the first element of the SUBCAT list of a sign is an NP[*str*], it is called the *(syntactically) external argument* of that sign.

(3.38) *Syntactically Internal Argument ('Direct Object')*:

If the second element of the SUBCAT list of a sign is an NP[*str*], it is called the *(syntactically) internal argument* of that sign.

Heinz and Matiasek (1994, pp.209–210) formalize this CASE PRINCIPLE by giving the following constraints:[45]

(3.39)
$$\begin{bmatrix} \text{SYNSEM}|\text{LOC}|\text{CAT} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} & \\ \text{VFORM} & \textit{fin} \end{bmatrix} \\ \text{SUBCAT} & \langle\rangle \end{bmatrix} \\ \text{DTRS} & \begin{bmatrix} \textit{h-c-str} \\ \text{HEAD-DTR}|\ldots|\text{SUBCAT}\ \langle \text{NP}[\textit{str}],\ \ldots\rangle \end{bmatrix} \end{bmatrix} \rightarrow$$
$$\begin{bmatrix} \text{DTRS}|\text{HEAD-DTR}|\ldots|\text{SUBCAT}\ \langle \text{NP}[\textit{snom}],\ \ldots\rangle \end{bmatrix}$$

(3.40)
$$\begin{bmatrix} \text{SYNSEM}|\text{LOC}|\text{CAT} & \begin{bmatrix} \text{HEAD} & \textit{verb} \\ \text{SUBCAT} & \langle\rangle \vee \langle \textit{synsem}\rangle \end{bmatrix} \\ \text{DTRS} & \begin{bmatrix} \textit{h-c-str} \\ \text{HEAD-DTR}|\ldots|\text{SUBCAT}\ \langle \textit{synsem},\ \text{NP}[\textit{str}],\ \ldots\rangle \end{bmatrix} \end{bmatrix} \rightarrow$$
$$\begin{bmatrix} \text{DTRS}|\text{HEAD-DTR}|\ldots|\text{SUBCAT}\ \langle \textit{synsem},\ \text{NP}[\textit{sacc}],\ \ldots\rangle \end{bmatrix}$$

(3.41)
$$\begin{bmatrix} \text{SYNSEM}|\text{LOC}|\text{CAT} & \begin{bmatrix} \text{HEAD} & \textit{noun} \\ \text{SUBCAT} & \langle\rangle \vee \langle \textit{synsem}\rangle \end{bmatrix} \\ \text{DTRS} & \begin{bmatrix} \textit{h-c-str} \\ \text{HEAD-DTR}|\ldots|\text{SUBCAT}\ \langle \textit{synsem},\ \text{NP}[\textit{str}],\ \ldots\rangle \end{bmatrix} \end{bmatrix} \rightarrow$$
$$\begin{bmatrix} \text{DTRS}|\text{HEAD-DTR}|\ldots|\text{SUBCAT}\ \langle \textit{synsem},\ \text{NP}[\textit{sgen}],\ \ldots\rangle \end{bmatrix}$$

Note that the locus of this CASE PRINCIPLE is *phrase* and that it makes reference to *head-complement-structure* values of the DAUGHTERS (DTRS) attribute. In this sense, this principle is configurational. We will examine the apparent necessity of formulating such case principles configurationally in the next Chapter, where we will also discuss problems such formulations bring and propose an alternative account.

3.4.3 Similar Accounts

A number of researchers applied Heinz and Matiasek's (1994) account to phenomena of languages other than German. We will briefly look at Yoo's (1993) and Bratt's (1996) analyses of case in Korean, and Grover's (1995) analysis of case assignment in English, and we will mention Przepiórkowski's (1996a) account of case in Polish.[46]

[45] For reasons of brevity, we will not illustrate this analysis here, but see Heinz and Matiasek (1994), Grover (1995) and Przepiórkowski (1996a).

[46] Two more HPSG analyses employing the structural/lexical case distinction (in the context of German) are Müller (1997a, 1998a) and Meurers (1999b); because of their *prima facie* similarity to the approach

3.4.3.1 Yoo (1993)

Yoo (1993) is concerned with *prima facie* ECM (subject-to-object raising) constructions in Korean, in which the raised object can have either nominative or accusative case.

(3.42) a. Mary-ka **John-i** ttokttokha-ta-ko mit-nun-ta.
Mary$_{nom}$ John$_{nom}$ smart$_{dec,comp}$ believe$_{pres,dec}$
'Mary believes John to be smart.'

b. Mary-ka **John-ul** ttokttokha-ta-ko mit-nun-ta.
Mary$_{nom}$ John$_{acc}$ smart$_{dec,comp}$ believe$_{pres,dec}$
'Mary believes John to be smart.'

Yoo (1993) argues that this case optionality reflects a structural difference between (3.42a) and (3.42b): in the former, *mit-nun-ta* 'believe' subcategorizes for a clause, with *John-i* realized as its subject, hence the nominative case. On the other hand, in the latter example, *mit-nun-ta* is a raising verb, so *John-ul* is realized as an object, hence the accusative.

However, the simplistic case assignment approach of Pollard and Sag (1994) (assignment within lexical entries of finite verbs) is not sufficient here because, as Yoo (1993) shows on the basis of other examples, the lower verb in true raising constructions such as (3.42b) is finite. This means that it should assign its (raised) subject the nominative case, just like all finite verbs do. This, in turn, would result in case clash because the higher verb assigns this element the accusative case.

The solution Yoo (1993) proposes follows Pollard (1994) and Heinz and Matiasek (1994). She adopts the structural/lexical case dichotomy and posits the following (partial; slightly simplified below) lexical entries for the stems *mit-* 'believe' and *ttokttokha-* 'smart' (Yoo, 1993, p.189)...

(3.43) a. *mit-* (as in (3.42a)): $\begin{bmatrix} \text{SUBJ} \ \langle \text{NP}[\textit{str}] \rangle \\ \text{COMPS} \ \langle \text{S} \rangle \end{bmatrix}$

b. *mit-* (as in (3.42b)): $\begin{bmatrix} \text{SUBJ} \ \langle \text{NP}[\textit{str}] \rangle \\ \text{COMPS} \ \langle \boxed{1}\text{NP}[\textit{str}],\ \text{VP}[\text{SUBJ}\ \boxed{1}] \rangle \end{bmatrix}$

c. *ttokttokha-*: $\begin{bmatrix} \text{SUBJ} \ \langle \text{NP}[\textit{str}] \rangle \end{bmatrix}$

... as well as the following CASE PRINCIPLE (for Korean) (Yoo, 1993, p.189):

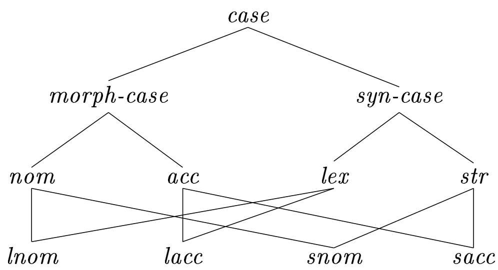
(3.44) CASE PRINCIPLE (for Korean):

A structural NP which is a daughter of a phrase α is *nom* if it is a SUBJ-DTR of α, and *acc* if it is a COMP-DTR of α.

Moreover, on the basis of the behaviour of Korean emotion verbs (psych-verbs), Yoo (1993) argues that nominative and accusative can also be lexical and proposes a case hierarchy similar to Heinz and Matiasek's (1994) hierarchy in (3.32) above.

advocated in this study, we will discuss them in the next Chapter, when we develop an alternative account. Other works assuming similar accounts, which we will not review here, are: Ryu (1993), Gerdemann (1994), and Chung (1995).

(3.45)



3.4.3.2 Grover (1995)

Grover (1995, pp.35ff.) assumes that all case marking in English is structural and, hence, retains Pollard and Sag's (1994) simple type hierarchy for English, in which the type *case* has only two subtypes, *nominative* and *accusative*. However, unlike in Pollard and Sag (1994), all case assignment takes place in the syntax, rather than in the lexicon. Specifically, Grover (1995, p.35) proposes the following CASE PRINCIPLE (for English):[47]

(3.46) CASE PRINCIPLE (for English):

i. In a feature structure of type *head-comp-struc*, any NPs in the COMPS list of the head daughter are [CASE *acc*].

ii. In a feature structure of type *head-subj-struc*, the NP in the SUBJ list of the head daughter is [CASE *nom*] if the head is specified as [VFORM *fin*] or [VFORM *base*], and [CASE *acc*] otherwise.

Grover (1995) shows that this CASE PRINCIPLE correctly accounts for case assignment to subjects of non-finite verbs, as in (3.47) (Grover, 1995, (10), p.37), where the nominative is assigned to the pronoun realized as the subject of the VP[*base*] in (3.47b), and the accusative is assigned to pronouns realized as subjects of VP[*inf*] and VP[*grnd*] in (3.47a) and (3.47c), respectively.

(3.47) a. It would be possible for him (*he) to be promoted.

b. It was decided that he (*him) be promoted.

c. Him (*he) being promoted made us all glad.

On the other hand, if case were a strictly lexical phenomenon, as Pollard and Sag (1994) would have it, and non-finite verbs did not assign case to their subjects, then nothing would predict the nominative case in (3.47b) and the accusative in (3.47c). Moreover, neither *be* nor *promoted* can assign the accusative to their subjects (because of the nominative in (3.47b)), nor can they assign the nominative (because of the accusative in (3.47a)). Thus, in the absence of more general case assignment principles, none of the three possible positions on case assignment to subject by non-finite verbs (i.e., assign nominative, assign accusative, do not assign case) is able to account for examples (3.47). So, it seems that even in a language with case as impoverished as in English, case assignment cannot be restricted to the lexicon.[48]

[47] We simplify a little here.
[48] See Grover (1995, pp.38ff.) for other advantages of syntactic case assignment in English.

3.4.3.3 Przepiórkowski (1996a)

Another analysis based on that of Heinz and Matiasek (1994) is given in Przepiórkowski (1996a).[49] It is concerned with the so-called Genitive of Negation and case patterns in numeral phrases, both in Polish, and both much more extensively discussed in Chapter 5. Here, let us just point out that Genitive of Negation provides an argument against strictly lexicalist approaches to case assignment as strong as that made by Pollard (1994) and discussed in §3.4.2.1.

Consider the case of the object in (3.48) below.

(3.48) a. Janek lubi Marysię / *Marysi.
John$_{nom}$ likes Mary$_{acc}$ / Mary$_{gen}$
'John likes Mary.'

b. Janek nie lubi Marysi / *Marysię.
John$_{nom}$ NM likes Mary$_{gen}$ / Mary$_{acc}$
'John doesn't like Mary.'

As (3.48a) shows, *lubić* 'like' normally occurs with an accusative object; the genitive is not allowed. However, as soon as the verb is negated, the object must bear the genitive case, cf. (3.48b). This phenomenon is called 'Genitive of Negation' (GoN).

(3.48) by itself does not provide a strong argument against the lexicality of case assignment in Polish because *nie lubi* could be analysed as a different lexical item than *lubi*.[50]

However, the long distance GoN, as in (3.49), does provide such evidence.[51]

(3.49) a. Janek chce pocałować Marysię.
John wants kiss$_{inf}$ Mary$_{acc}$
'John wants to kiss Mary.'

b. Janek nie chce pocałować Marysi.
John NM wants kiss$_{inf}$ Mary$_{gen}$
'John doesn't want to kiss Mary.'

Such data are analyseable in the strictly lexicalist approach only at a very prohibitive cost: there would have to be two verbs *lubić* 'like', one taking an accusative complement and occurring in the absence of a higher negation, the other one taking a genitive complement and occurring only in negative environments; in fact all accusative-taking verbs would have to show such a split.

Thus, Polish is yet another language providing evidence against the strictly lexicalist approach to case assignment tentatively proposed in Pollard and Sag (1994).

[49] A much abridged version of Przepiórkowski (1996a) was also published as Przepiórkowski (1997b).

[50] Actually, in Polish pre-verbal negation does seem to be a verbal prefix; cf. Kupść and Przepiórkowski (1999).

[51] Long distance GoN is not discussed in Przepiórkowski (1996a), but it will be extensively discussed in Chapter 5 (§5.2.3).

3.4.3.4 Bratt (1996)

Finally, the comprehensive account of case assignment in Korean given by Bratt (1996) differs from previous accounts mainly in her understanding of the structural/lexical dichotomy. For Bratt (1996), there is no morphological overlap between structural (grammatical, in her terminology) and lexical (semantic) cases: nominative and accusative are the grammatical cases in Korean, while dative, etc., are the semantic cases, constraining the CONTENT value of the verb.

Bratt (1996, pp.286ff.) provides ample evidence, from nominative/accusative alternations in passive, in psych-verbs and on duration adverbials, that Korean grammatical case marking cannot be (only) lexical. She then moves to positing case principles similar to those of Heinz and Matiasek (1994) and others, i.e., resolving grammatical case to nominative or accusative depending on configuration (according to whether the argument is on SUBJ-DTR or on COMP-DTRS) and on agentivity of the verb.[52]

3.4.4 Summary

There is conclusive evidence from languages such as Icelandic, German, Korean, English and Polish, only some of which has been repeated here, that case assignment cannot be restricted to the lexicon and that it must be modelled via general grammatical principles. We will take this result as established and the unconvinced reader is referred to the works cited above for further arguments.

All previous HPSG approaches to case assignment reviewed here assume the structural vs. lexical case distinction, with lexical case assigned in the lexicon and structural case assigned via grammatical principles. Moreover, they all assume that these grammatical principles are configurational, in the sense of being formulated on the level of DTRS or being hardwired into phrase structure schemata.

In Chapter 4, we will see that this last assumption is both controversial for conceptual reasons and untenable for formal theory-internal reasons, we will formulate an alternative HPSG approach to case assignment free from these problems, and we will apply it to some of the phenomena (from English, German and Icelandic) mentioned above. In Chapter 5, we will see how this new approach can be extensively employed to analyse a number of case phenomena in Polish.

[52] Bratt (1996, pp.288, 325f.) proposes to hardwire these case principles into grammar schemata.

Chapter 4

Non-Configurational Case Assignment

In the previous Chapter, we reviewed various approaches to case assignment dominant in current linguistics. In this Chapter, we present our analysis of so-called structural (grammatical) case assignment. The main, and novel, characteristic of this analysis is that it is completely non-configurational, i.e., it does not make any recourse to syntactic tree configurations.[1]

First, in §4.1, we will mention some problems with previous HPSG approaches to case assignment, and then, in §4.2 we will present our analysis.[2] In §4.3, we will apply this analysis to various data from English, German and Icelandic, showing that it is able to account for the kind of data handled by previous HPSG approaches to case. In §4.4, we will look at analyses of case assignment similar to ours and we will point out their strengths and weaknesses. This will be the basis for a revision of our analysis in §4.5. We will conclude this Chapter with a brief summary in §4.6.

4.1 Problems with Previous Accounts

Although HPSG approaches to case assignment such as Sag *et al.* (1992) and, especially, Heinz and Matiasek (1994) present a clear improvement on the 'standard' HPSG analysis of Pollard and Sag (1994), they are themselves imbued with problems. We will briefly review these problems below.

4.1.1 Configurationality

The first, conceptual, objection to the configurational account of case assignment was raised by Pollard (1994, p.294), who mentions "the traditional aversion within HPSG theory to tree-configurationally-based notions." This is, of course, mainly a matter of aesthetics, but there

[1]To the best of our knowledge, this is the first such an analysis, although suggestions along similar lines were made earlier, e.g., by Bratt (1990) and Zaenen *et al.* (1985).

[2]The main points of the analysis of this section were first presented during the Third International HPSG Conference, 20–22 May 1996, Marseilles, France (Przepiórkowski, 1996b), and they are summarised in Przepiórkowski (1999b, §15.3).

seems to be a more direct argument against configurational case assignment in German, based on the kind of data considered by Meurers (1999b).

Meurers (1999b) looks at cases of fronted constituents consisting of an infinitival verb (or VP) and its subject, e.g.:

(4.1)	[**Ein**	**Außenseiter**	gewinnen]	wird	hier	nie.	
	an_{nom}	outsider	win_{inf}	will	here	never	
	'An outsider will never win here.'						
(4.2)	[**Einen**	**Außenseiter**	gewinnen]	läßt	Gott	hier	nie.
	an_{acc}	outsider	win_{inf}	lets	god	here	never
	'God never lets an outsider win here.'						

Such examples are interesting because they involve two *prima facie* incompatible assumptions: first, that fronted constituents really are single constituents, i.e., that *ein(en) Außenseiter* is realized as the subject of *gewinnen*, and second, that *wird* and *läßt* are raising verbs, i.e., *ein Außenseiter* is raised to the subject position of *wird* in (4.1) and *einen Außenseiter* is raised to the object position of *läßt* in (4.2).

Assuming the essential correctness of the first assumption,[3] i.e., that the fronted infinitival phrases are single constituents and that *ein(en) Außenseiter* is configurationally realized as the subject of *gewinnen*, the configurational case assignment approach of Pollard (1994) and Heinz and Matiasek (1994) (or any configurational case assignment analysis) cannot explain the origin of the nominative case in (4.1) and the accusative case in (4.2). If nominative case were assigned to all realized subjects, as in Pollard's (1994) STRUCTURAL PRINCIPLE OF STRUCTURAL CASE RESOLUTION (3.25) (p.61), then the accusative case in (4.2) would be unaccounted for. If the accusative were assigned, then the nominative in (4.1) would be predicted to be ungrammatical. If no case is assigned to realized subjects of infinitival verbs, as in Heinz and Matiasek's (1994) CASE PRINCIPLE (3.36) (p.65), then it must be assigned in some other, non-configurational way.

We will return to this problem in §4.4 below.

4.1.2 Non-Locality

Another conceptual problem with previous HPSG accounts of case assignment is that they employ non-local mechanisms (case principles are stated as sets of constraints on values of DTRS) to deal with what is often considered an essentially local phenomenon, i.e., an intimate relation between a head and its dependents. This view is explicitly expressed in the literature, e.g.:

> **Case** is a system of marking dependent nouns for the type of relationship they bear to their heads.
>
> (Blake, 1994, p.1)

[3] As Detmar Meurers pointed out to us (p.c.), this assumption, although commonly held, is not uncontroversial; see, e.g., Kiss (1994, pp.100–101) for some examples of (apparent?) cases of double fronting.

Sometimes a more specific view is expressed, i.e., that case assignment takes place on a head's obliqueness (or grammatical function) hierarchy, e.g.:

> [T]he highest available GF [= grammatical function; A.P.] is assigned NOM case, the next highest ACC. (*Universal*)
>
> (Zaenen and Maling 1983, p.176; Zaenen *et al.* 1985, p.466)

> It seems likely that [case assigning; A.P.] association must be defined on grammatical (or thematic) relations in such [free word-order; A.P.] languages, and indeed perhaps universally...
>
> (Yip *et al.*, 1987, p.220)

> I assume that the mapping between syntactic cases and GFs [= grammatical functions; A.P.] reflects a hierarchy of grammatical functions...
>
> (Maling, 1993, p.50)

Thus, an analysis which preserves this intuition should be preferred to one that violates it (other things being equal). Such an analysis is offered in §4.2.

4.1.3 Extraction

A more serious problem concerns the incompatibility of configurational case assignment accounts with traceless approaches to extraction, strong in current HPSG theorizing.

The problem is as follows: on the traceless approach to extraction, the extracted element originates in the SLASH set of its head. It is never present on a VALENCE attribute (although it is present on ARG-ST), so it is never realized as a subject or an object. Instead, an extracted element is realized via the HEAD-FILLER SCHEMA (Pollard and Sag, 1994, pp.164, 403), but at this stage the information about, e.g., the grammatical function of the element, necessary to decide between the nominative and the accusative in languages such as Icelandic, German and English, is unavailable.

Extraction with traces does not create such difficulties because traces are 'realized' in the syntactic tree local to the extraction site (they occur on DTRS) and can be assigned cases via a CASE PRINCIPLE like that of Pollard (1994) or Heinz and Matiasek (1994). Because of the LOCAL-connectivity between the trace and the extracted element (the filler), this case specification is available wherever the extracted element is eventually realized.

How could this problem be circumvented? One approach would be to have additional constraints on extraction sites, i.e., on *word*s introducing non-empty SLASH values. Such a constraint would state, roughly, that an NP in SLASH must be assigned the nominative case if it corresponds to the subject, and the accusative case otherwise. This is the route taken by Grover (1995, p.41), who adds the following clause to her CASE PRINCIPLE (3.46) (cf. p.68 above):

(3.46) iii. If a lexical sign has an NP in its INHER|SLASH set then that NP is [CASE *nom*] if the sign has a finite VP in COMPS and [CASE *acc*] otherwise.

One problem with any such additional principle is that it brings about redundancy and heterogeneity. Such a case principle is redundant because the basic intuition that subjects receive the nominative case and objects receive the accusative case must be stated twice in the grammar: for non-extracted arguments, cf. clauses i. and ii. in (3.46), p.68, and for extracted arguments, cf. clause iii. above. It is heterogeneous because parts of such a case principle are stated as configurational constraints on values of DTRS (cf. i. and ii. in (3.46) on p.68), and other parts as constraints on *word*s (cf. iii. above). Another problem with this solution is that it is highly dependent on the particular implementation of the traceless analysis approach. For example, the above clause iii. of Grover's (1995) CASE PRINCIPLE relies heavily on the analysis of extraction presented in Pollard and Sag (1994, ch.9), and it is incompatible with either Sag's (1997) lexical approach to unbounded dependencies, or Bouma *et al.*'s (1999b) traceless approach without lexical rules.

A similar solution, equally unsatisfactory, would be to hardwire case assignment rules into whatever mechanism is responsible for traceless extraction (e.g., into COMPLEMENT EXTRACTION LEXICAL RULE and SUBJECT EXTRACTION LEXICAL RULE). This solution shares all the flaws of the previous one, and adds decreased modularity of the resulting grammar.

The heterogeneity problem would be slightly alleviated if case were assigned to extracted elements configurationally, at the level of the HEAD-FILLER SCHEMA. However, in order to do so, case assignment rules would have to traverse the tree to find the place from which the filler is extracted (and thus learn about the grammatical function of the extracted element, about the category of its governor, etc.). Apart from sharing with the previous tentative solution the problem of redundancy (missed generalization), this account would have to rely on complex global relations, thus giving up any pretence of locality. A variant of this solution (suggested by Carl Pollard, p.c., Tübingen, July 1997) would be to package all the information necessary to assign case to the extracted element into the SLASH value and carry it all the way up to the HEAD-FILLER SCHEMA. Again, in order for this idea to work, the number of case assigning rules would have to (unnecessarily, as we show below) be multiplied.

In summary, we do not see any non-redundant way of dealing with the incompatibility of configurational case assignment with traceless extraction and, because of the wide-spread use of traceless approaches to extraction, we consider this to be a serious, albeit theory-internal, blow to configurational case assignment. By contrast, the analysis developed in §4.2 is compatible with all current HPSG approaches to extraction (including the 'traced' approach of Pollard and Sag (1994, ch.4) and traceless approaches of Pollard and Sag (1994, ch.9), Avgustinova and Oliva (1996), Sag (1997) and Bouma *et al.* (1999b)), it is non-redundant (generalizations are stated only once in the grammar) and homogeneous (there is a single locus of case assignment).

4.1.4 Cliticization

Another, and even more serious, problem for configurational case assignment, similar to that discussed in the previous section, is its incompatibility with HPSG analyses of Romance cliticization.

Miller and Sag (1997) argue at length that French pronominal 'clitics' are not syntactic constituents in any sense and that they should be analysed as pronominal affixes instead. As such, they never occur on VALENCE attributes (although they occur on ARG-ST), so they cannot be realized configurationally. Similar analyses of Romance clitics are assumed and/or argued for by Miller (1992), Abeillé *et al.* (1998b), Abeillé *et al.* (1998a) (for French) and by Monachesi (1993, 1995, 1998) (for Italian).

Although these affixal arguments are not syntactic elements and do not occur on VALENCE attributes, they behave just like other arguments with respect to case assignment: when they correspond to direct objects, they have to be accusative, when they are non-raised subjects, they are nominative, when they correspond to subjects of lower verbs but were raised to the object position of the higher verb, they must be accusative.[4] This means that pronominal affixes should be subject to the same general rules of case assignment.

Here the problem is even clearer than in case of traceless approaches to extraction: the only place where morphosyntactic information about a pronominal affix is specified in the sign corresponding to the whole utterance is the ARG-ST of the head verb. In §4.2 we will argue that, on current HPSG assumptions, ARG-ST is the only possible locus of case assignment.[5]

4.1.5 Summary

In summary, previous HPSG approaches, although correctly modelling the narrow set of data they are designed for, cannot be easily extended to the full range of data. Most seriously, they are incompatible with various HPSG analyses of extraction and cliticization, and they are conceptually controversial because of their reliance on configurationality and non-local mechanisms. Below, we will propose an analysis free from these problems.

4.2 Non-Configurational Case Assignment in HPSG

In this section, we will develop a comprehensive and general approach to the assignment of structural case, which will build on previous approaches, but avoid their shortcomings.

Below, we will assume, together with Pollard (1994), Heinz and Matiasek (1994) and earlier work in other frameworks, the dichotomy between the structural case, assigned through general grammatical rules, and the lexical case, assigned by particular heads. For concreteness, we will follow much of the literature assuming that lexical case is idiosyncratic, although we believe that, ultimately, much of what is known as lexical (inherent, quirky) case is subject to general lexico-semantic rules. Investigating such rules is outside the scope of this study, though.[6] Also, we consider the term 'structural case' somewhat of a misnomer in the current context, but we will retain it here for the reasons of historical (in)accuracy.

The crucial difference between the approach presented below and previous HPSG approaches

[4]The last statement is an oversimplification; see, e.g., Bratt (1990), Miller and Sag (1997), Calcagno and Pollard (1997, 1999). The general point, i.e., that pronominal affixes are subject to the same case assignment rules as dependents realized configurationally, remains valid, though.

[5]However, assuming the setup of Bouma *et al.* (1999b), case should probably be assigned on DEPENDENTS, cf. Chapter 9. In the remainder of this Part, we will not assume DEPENDENTS, but whatever we say about ARG-ST carries over to this attribute.

[6]In particular, we do not deal here with linking; see Wechsler (1995), Smith (1996) and Davis (1997) for considerations of linking within HPSG or compatible with HPSG.

concerns two matters: the locus of case assignment and how much configurational information is necessary in order to assign structural case. We will deal with these matters in the two subsections below (§§4.2.1–4.2.2), and then we will present a schematic version of our CASE PRINCIPLE (§4.2.3).

4.2.1 Locus of Case Assignment

Previous HPSG approaches to case assignment assumed that all dependents of a head which bear structural case are realized in the local configuration of this (or the highest such) head. In order to maintain this assumption and have a homogeneous theory of structural case assignment, 1) there must be a tree-configurational position for extracted elements local to their heads (cf. traces of Pollard and Sag (1994, ch.4)), and 2) pronominal elements must be realized configurationally. We saw in §4.1 that both these assumptions are explicitly rejected in current HPSG literature, and that case assignment on DTRS is controversial also for conceptual reasons. If case cannot be assigned on DTRS, then what should be the locus of case assignment?

The possible loci are those places within the HPSG architecture of *sign* where relevant CASE values appear, i.e.:

- DTRS: the value of this attribute contains whole *sign*s of NPs, hence also their CASE values;
- VALENCE attributes (SUBJ, COMPS, SPR): contain *synsem*s of NPs;
- ARG-ST: also contains relevant *synsem*s;
- SLASH: contains *local* parts of some NPs.

Note that CONTENT is not a possible locus of case assignment because, on the standard (Pollard and Sag, 1994) assumptions, the values of its attributes corresponding to NPs are only *indices*.

Of the above possible loci, we have already rejected DTRS. Also SLASH is not a viable candidate because it contains information only about some (possibly no) NPs in the utterance. Case cannot be assigned on VALENCE either, because of some of the reasons given already against DTRS: neither extracted elements (on the traceless approach) nor pronominal affixes are present on VALENCE attributes. On the other hand, *synsem*s corresponding to all these elements are present on ARG-ST, so, at least at first blush, it seems to be a reasonable candidate for the single locus of case assignment. In the remainder of this Chapter, we will see that ARG-ST is indeed a possible locus of structural case assignment theory, and that such a theory is free from problems with previous HPSG case assignment techniques. Since all other candidates for such a locus must be rejected, ARG-ST turns out to be *the only* possible locus of a homogeneous case assignment theory compatible with current HPSG assumptions (but see fn.5 on p.75 above).

4.2.2 Configurational Information

How can the result of the previous subsection, i.e., that ARG-ST is the only possible locus of structural case assignment, be reconciled with data such as (3.27) (repeated below for convenience), from Pollard (1994), which—as we saw in §3.4.2—suggest a configurational approach to case assignment?

(3.27) a. [**Den Wagen** zu reparieren] wurde versucht.
the$_{acc}$ car to fix Aux tried
'It was attempted to fix the car.'

b. [Zu reparieren versucht] wurde **der Wagen** lange Zeit.
to fix tried Aux the$_{nom}$ car long time
'It was attempted to fix the car for a long time.'

The problem with assigning the right case to the object of *reparieren* 'fix' lexically was that there was not enough information available at the level of this verb: *reparieren* does not 'know' whether its object will eventually be realized configurationally as an object or as a subject.

However, there is another, non-configurational, way of looking at this problem. The crucial observation is that the only troublesome case for non-configurational case assignment is raising; for example, if not for raising, Pollard's (1994) STRUCTURAL PRINCIPLE OF STRUCTURAL CASE RESOLUTION (3.25) on p.61 and Heinz and Matiasek's (1994) CASE PRINCIPLE (3.36) on p.65 could be replaced by the following principle (assuming a case hierarchy as in (3.32)):

(4.3) NON-CONFIGURATIONAL CASE PRINCIPLE (1st version; German):

In a *word* of category
verb if the initial element on ARG-ST is a NP[*str*], it has a CASE value of *snom*,
verb all NP[*str*]s non-initial on ARG-ST have a CASE value of *sacc*,
noun ...

Now, the non-configurational angle on examples like (3.27) is that the same NON-CONFIGURATIONAL CASE PRINCIPLE could account for them if only it were applied selectively to the right elements of a *word*'s ARG-ST. For example, if (4.3) were allowed to assign case to the object of *reparieren* at the level of *reparieren* in (3.27a), but disallowed to apply to this object at the level of *reparieren* and, instead, allowed to assign case to the subject of *wurde* in (3.27b), then it would rightly assign the accusative to the object of *reparieren* in the first case and the nominative in the second case. The intuition behind this way of looking at case assignment is that the principle in (4.3) is essentially correct but, for each NP[*str*] element of an ARG-ST, it should be delayed to the point where this NP[*str*] is realized (configurationally, or extracted, or realized as a pronominal affix), that is, to the highest ARG-ST, from which it cannot be raised any further.[7] In other words, a principle such as (4.3), when applying to a *word*, should take into consideration only those NP[*str*]s on the ARG-ST of this *word*, which are realized from this ARG-ST (that is, NP[*str*] *synsem*s which are not raised to a higher ARG-ST).[8]

[7] We will see in §§4.4–4.5 that the 'that is' part in this sentence is not quite correct.
[8] Again, the 'that is' in the parenthetical is not quite right.

In the next subsection we will formalize this intuition.

4.2.3 Case Principle

4.2.3.1 Marking Arguments as Locally Realized

Since the only 'non-local' information needed to assign structural case is binary, i.e., whether the argument is realized locally, or whether it is raised to be realized higher up, we minimally enrich the information present on ARG-ST as well as on VALENCE lists: we assume that values of these attributes are lists of objects of sort *argument* (abbreviated to *arg*), for which two attributes are appropriate, the *synsem*-valued ARGUMENT (abbreviated to ARG) and the binary REALIZED, whose value is '+' if the argument is realized locally, and '−' otherwise.[9]

(4.4)
$$\begin{bmatrix} \textit{argument} \\ \text{ARGUMENT } \textit{synsem} \\ \text{REALIZED } \textit{bool} \end{bmatrix}$$

(4.5)
$$\begin{bmatrix} \textit{category} & \\ \text{VALENCE} & \begin{bmatrix} \text{SUBJECT } \textit{list(argument)} \\ \text{SPECIFIER } \textit{list(argument)} \\ \text{COMPLEMENTS } \textit{list(argument)} \end{bmatrix} \\ \text{ARGUMENT-STRUCTURE } \textit{list(argument)} & \end{bmatrix}$$

What remains to be said is how to ensure proper instantiation of the REALIZED feature. In order to do so, we have to explicate our assumptions about the relation between ARG-ST and VALENCE. Following much of the HPSG literature, we assume here that ARG-ST is present on *word*s only (Miller and Sag, 1997; Abeillé *et al.*, 1998b; Bouma *et al.*, 1999b),[10] and it is the concatenation of the VALENCE features, plus perhaps gaps (arguments extracted at a given word) and arguments realized as pronominal affixes (Sag, 1997; Miller and Sag, 1997; Abeillé *et al.*, 1998b; Bouma *et al.*, 1999b). Thus, in essence, there are three ways of realizing an argument on ARG-ST: via VALENCE PRINCIPLE, via whatever mechanism is responsible for lexical extraction (assuming no traces), e.g., extraction lexical rules, and via whatever mechanism is responsible for pronominal affixation. Each of these three mechanisms has to mark the corresponding arguments as [REALIZED +]. Specifically:

(4.6) The VALENCE PRINCIPLE of Pollard and Sag (1994, p.392) has to be reformulated in the following way: In a headed phrase, for each valence feature F, the F value of the head daughter is the concatenation of the phrase's F value with the list of [REALIZED +] SYNSEM values of the F-DTRS value.

[9]As suggested by Ivan Sag (p.c., Marseilles, May 1996), the distinction between realized and unrealized arguments could be encoded via subtypes of *synsem*, rather than via the REALIZED feature. We are sympathetic with this suggestion, however, in order to pursue it, we would have to treat raising as structure-sharing between *local* values, rather than *synsem*s. (The reason for this is that we do not want to raise the information about realizedness of an argument (it might be unrealized on one ARG-ST and realized on another).) For the purpose of this study, we remain conservative and retain the standard assumption that raising involves structure-sharing of *synsem*s.

[10]See Przepiórkowski and Kupść (1997a) for a possible formalization of this requirement. See also §5.4.1.2 for arguments against this assumption.

(4.7) Assuming (for concreteness) that extraction is done via extraction lexical rules like those of Pollard and Sag (1994, ch.9), such extraction rules mark the arguments removed from the VALENCE features as [REALIZED +].

(4.8) Assuming (for concreteness) the approach to pronominal affixation of Miller and Sag (1997), arguments whose ARG values are of type *affix* must be [REALIZED +].

Note that, although some of these processes (the VALENCE PRINCIPLE and the extraction lexical rules) resolve the value of REALIZED on VALENCE, at the same time they resolve it on ARG-ST: this is guaranteed by the structure-sharing of (some of) the word's arguments between ARG-ST and VALENCE.

On the other hand, care must be taken to ensure that the arguments which are not locally realized (e.g., because they are raised) are marked as [REALIZED −] and, hence, exempt from the CASE PRINCIPLE. The common characteristics of such unrealized arguments is that they are present on a VALENCE attribute of a subcategorized element. (For example, consider the raising verb *seem*: it subcategorizes for a VP complement, i.e., for a *synsem* with non-empty VALENCE|SUBJ.) In other (Pollard's, p.c., July 1997) words, they are valents' valents. Thus, we need a principle stating that valents' valents are [REALIZED −]. Such a principle is schematically given in (4.9), where F_1 and F_2 range over {SUBJ, SPR, COMPS}.[11]

(4.9) $$\textit{valence} \rightarrow \left[\mathrm{F}_1 \;\, \textit{list}\left(\begin{bmatrix} \textit{arg} \\ \text{ARG} \;\; \begin{bmatrix} \textit{synsem} \\ \text{L}|\text{C}|\text{VAL}|\mathrm{F}_2 \;\, \textit{list}\left(\begin{bmatrix} \textit{arg} \\ \text{REALIZED} \;\; - \end{bmatrix}\right) \end{bmatrix} \end{bmatrix} \right) \right]$$

From now on, we will follow Calcagno and Pollard's (1997) convention of abbreviating XP[REALIZED α] to XP^{α}, e.g., NP[CASE *str*, REALIZED +] becomes NP^{+}[*str*].

4.2.3.2 Assigning Case to Realized Arguments

Now, the CASE PRINCIPLE for a given language consists of a series of constraints resolving structural cases of locally realized NPs depending on the position of the NP in the obliqueness hierarchy, the category of the governor, etc. For example, the NON-CONFIGURATIONAL CASE PRINCIPLE for German (4.3) can be modified in the following way:

(4.10) NON-CONFIGURATIONAL CASE PRINCIPLE (2nd version; German):

In a *word* of category
- *verb* if the initial element on ARG-ST is a NP^{+}[*str*], it has a CASE value of *snom*,
- *verb* all NP^{+}[*str*]s non-initial on ARG-ST have a CASE value of *sacc*,
- *noun* ...

[11] See §A.3.1 in the Appendix on formalization of so-called 'parametric types' such as $\textit{list}\left(\begin{bmatrix} \textit{arg} \\ \text{REALIZED} \;\; - \end{bmatrix}\right)$.

The first two clauses of this CASE PRINCIPLE may (again, assuming a case hierarchy as in (3.32)) be stated formally as in (4.11)–(4.12).[12]

$$(4.11)\quad \begin{bmatrix} \textit{cat} \\ \text{HEAD } \textit{verb} \\ \text{ARG-ST } \left\langle \begin{bmatrix} \text{ARG NP}[\textit{str}] \\ \text{REALIZED } + \end{bmatrix} \right\rangle \oplus \boxed{2} \end{bmatrix} \rightarrow \begin{bmatrix} \text{ARG-ST } \left\langle \begin{bmatrix} \text{ARG NP}[\textit{snom}] \end{bmatrix} \right\rangle \oplus \boxed{2} \end{bmatrix}$$

$$(4.12)\quad \begin{bmatrix} \textit{cat} \\ \text{HEAD } \textit{verb} \\ \text{ARG-ST } \boxed{1}\textit{nelist} \oplus \left\langle \begin{bmatrix} \text{ARG NP}[\textit{str}] \\ \text{REALIZED } + \end{bmatrix} \right\rangle \oplus \boxed{2} \end{bmatrix} \rightarrow \begin{bmatrix} \text{ARG-ST } \boxed{1} \oplus \left\langle \begin{bmatrix} \text{ARG NP}[\textit{sacc}] \end{bmatrix} \right\rangle \oplus \boxed{2} \end{bmatrix}$$

Note that the NON-CONFIGURATIONAL CASE PRINCIPLE, as formalized in (4.11)–(4.12), is more local than that in the informal version (4.10): it is construed as a set of constraints on lexical *category*.[13]

Note also that, although the informal version of the CASE PRINCIPLE, i.e., (4.10), is stated as a constraint on *word* objects, it is a non-lexical analysis, in the sense that it does not consist in positing particular lexical entries, but rather relies on general grammatical constraints. This is made even clearer by the formal version, i.e., (4.11)–(4.12), which are constraints on *category* objects.

In the next section we will illustrate this analysis by applying it to English extraction (Grover, 1995), to German optional argument attraction and remote passivization (Pollard, 1994), and to Icelandic quirky cases (Sag *et al.*, 1992).

4.3 Some Examples

4.3.1 English Extraction

4.3.1.1 Simple Facts

Before moving to extraction facts, we will point out various features of our analysis on the basis of the simpler examples (4.13).

(4.13) a. He (*him) likes her (*she).

b. He (*him) believes her (*she) to like him.

We assume, together with Grover (1995), that English does not have lexical cases and that it has two structural cases, *nom* and *acc*, both subtypes of *case*.

We also assume the CASE PRINCIPLE for English (4.14), replacing Grover's (1995) (3.46) (pp.68 and 73):[14]

[12]Recall that '⊕' indicates the append (or list concatenation) relation.

[13]This *category* is lexical on the common assumption that ARG-ST is appropriate for words only, cf., e.g., Miller and Sag (1997), Abeillé *et al.* (1998b) and Bouma *et al.* (1999b).

[14]It should be clear on the basis of (4.11)–(4.12) how this principle can be stated formally.

(4.14) NON-CONFIGURATIONAL CASE PRINCIPLE (English):

In a *word* of category

verb	all NP^{+}s non-initial on ARG-ST have a CASE value of *acc*,
verb	if the initial element on ARG-ST is a NP^{+}, it has a CASE value of *nom* if the *verb*'s VFORM is *fin* or *base*, and a CASE value of *acc* otherwise,
noun	...

Note, again, that although this is a constraint on *word* objects, this differs from the lexicalist approach to case assignment in Pollard and Sag (1994) in that syntactic case is not assigned directly in lexical entries, but, instead, it is resolved via a general grammatical constraint.

He (*him) likes her (*she). (4.13a) involves the finite verb *likes*, which subcategorizes for two NPs:

(4.15)
$$\begin{bmatrix} \textit{word} & \\ \text{PHON} & \text{likes} \\ \text{SS}|\text{LOC}|\text{CAT} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} \\ \text{VFORM } \textit{fin} \end{bmatrix} \\ \text{VAL} & \begin{bmatrix} \text{SUBJ} & \boxed{1}\langle \text{NP}_{arg} \rangle \\ \text{COMPS} & \boxed{2}\langle \text{NP}_{arg} \rangle \end{bmatrix} \\ \text{ARG-ST} & \boxed{1}\oplus\boxed{2} \end{bmatrix} \end{bmatrix},$$

$$\text{where NP}_{arg} \text{ abbreviates } \begin{bmatrix} \textit{arg} & \\ \text{ARG}|\text{LOC}|\text{CAT} & \begin{bmatrix} \text{HEAD} & \textit{noun} \\ \text{VAL} & \begin{bmatrix} \text{SUBJ} & \langle\rangle \\ \text{SPR} & \langle\rangle \\ \text{COMPS} & \langle\rangle \end{bmatrix} \end{bmatrix} \\ \text{REALIZED} & \textit{bool} \end{bmatrix}$$

Neither CASE values of these NPs, nor the values of their REALIZED are specified in the lexicon.

First the *word likes* combines with its object via the HEAD-COMPLEMENT SCHEMA (Pollard and Sag, 1994, p.348), and then the resulting *phrase* combines with the subject via the HEAD-SUBJECT SCHEMA (Pollard and Sag, 1994, p.347). There are two phrasal projections of the verb *likes* in the *sign* corresponding to (4.13a), both subject to the modified VALENCE PRINCIPLE (4.6), repeated below as (4.16).

(4.16) VALENCE PRINCIPLE (modified):

In a headed phrase, for each valence feature F, the F value of the head daughter is the concatenation of the phrase's F value with the list of [REALIZED +] SYNSEM values of the F-DTRS value.

This VALENCE PRINCIPLE, together with the HEAD-COMPLEMENT SCHEMA will ensure that the *sign* corresponding to *likes her* satisfies the following description:

$$
(4.17)\quad \left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{phrase}}\\
\text{PHON} & \text{likes her}\\
\text{SS|LOC|CAT|VAL} & \left[\begin{array}{ll}\text{SUBJ} & \boxed{1}\langle \text{NP}_{arg}\rangle\\ \text{COMPS} & \langle\rangle\end{array}\right]\\
\text{DTRS} & \left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{head-comp-struc}}\\
\text{SUBJ-DTR} & \langle\rangle\\
\text{COMP-DTRS} & \langle[\text{SS }\boxed{3}]\rangle\\
\text{HD-DTR} & \left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{word}}\\
\text{SS|LOC|CAT|VAL} & \left[\begin{array}{ll}
\text{SUBJ} & \boxed{1}\langle\text{NP}_{arg}\rangle\\
\text{COMPS} & \boxed{2}\left\langle\left[\begin{array}{l}\textit{arg}\\ \text{ARG }\boxed{3}\text{NP}_{ss}\\ \text{REALIZED }+\end{array}\right]\right\rangle
\end{array}\right]
\end{array}\right]
\end{array}\right]
\end{array}\right],
$$

where NP_{ss} abbreviates[15]

$$
\left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{synsem}}\\
\text{LOC|CAT} & \left[\begin{array}{ll}
\text{HEAD} & \textit{noun}\\
\text{VAL} & \left[\begin{array}{ll}\text{SUBJ} & \langle\rangle\\ \text{SPR} & \langle\rangle\\ \text{COMPS} & \langle\rangle\end{array}\right]
\end{array}\right]
\end{array}\right]
$$

Note that one of the effects of the VALENCE PRINCIPLE (4.16) is marking the NP element in the COMPS list of *likes* as [REALIZED +]; since this NP is structure-shared with the second member of the ARG-ST list of *likes* (cf. (4.15) above), the value of ARG-ST must at this point satisfy the following description: $\langle$NP, NP$^+\rangle$.

Via similar reasoning, also the first element of the ARG-ST of *likes* is specified as [REALIZED +] by the VALENCE PRINCIPLE applied to the *phrase* corresponding to *He likes her*. Thus, both NPs in the ARG-ST of *likes* are specified as NP$^+$, so they are subject to the CASE PRINCIPLE (4.14).

Now, (4.14) says that all non-initial NP$^+$ elements of a *verb*'s ARG-ST must be accusative, and the initial NP$^+$ of a *fin*ite *verb* must be nominative. This means that the ARG-ST of *likes* in (4.13a) must satisfy the following description: $\langle$NP$^+$[*nom*], NP$^+$[*acc*]$\rangle$.

He (*him) believes her (*she) to like him. The next example, (4.13b), illustrates assignment of the [REALIZED −] value to elements of ARG-ST raised to higher ARG-STs. A partial description of the subject-to-object raising verb *believes* is presented below:

$$
(4.18)\quad \left[\begin{array}{ll}
\multicolumn{2}{l}{\textit{word}}\\
\text{PHON} & \text{believes}\\
\text{SS|LOC|CAT} & \left[\begin{array}{ll}
\text{HEAD} & \left[\begin{array}{l}\textit{verb}\\ \text{VFORM } \textit{fin}\end{array}\right]\\
\text{VAL} & \left[\begin{array}{ll}\text{SUBJ} & \boxed{1}\langle\text{NP}\rangle\\ \text{COMPS} & \boxed{2}\langle[\text{ARG }\boxed{3}],\ \text{VP}[\textit{inf},\ \text{SUBJ }\langle[\text{ARG }\boxed{3}]\rangle]\rangle\end{array}\right]\\
\text{ARG-ST} & \boxed{1}\oplus\boxed{2}
\end{array}\right]
\end{array}\right]
$$

Note that what is raised by *believes* on current approach is only the *synsem* value of ARG (cf. $\boxed{3}$ above), not the whole *arg* member of the SUBJ of the lower verb.

By reasoning analogous to that applied in the previous example, the values of ARG-ST of *like* and *believes* must adhere to the following descriptions:

[15] The subscripts $_{arg}$ and $_{ss}$ will often be dropped when they can be inferred from the context.

(4.19) *like*: $[\textsc{arg-st}\ \langle \mathrm{NP}_{arg}[\textsc{arg}\ \boxed{3}],\ \mathrm{NP}^{+}_{arg}[acc]\rangle$

(4.20) *believes*: $[\textsc{arg-st}\ \langle \mathrm{NP}^{+}_{arg}[nom],\ \mathrm{NP}^{+}_{arg}[\textsc{arg}\ \boxed{3}\mathrm{NP}_{ss}[acc]],\ \mathrm{VP}^{+}_{arg}\rangle]$

All three arguments of *believes* are realized configurationally in *He believes her to like him*, so they are all marked as [REALIZED +] by the VALENCE PRINCIPLE (4.16). The two NP^{+}s are, again, assigned the nominative and the accusative in accordance with the NON-CONFIGURATIONAL CASE PRINCIPLE.

However, only the object of *like* is realized configurationally and marked as [REALIZED +] by the VALENCE PRINCIPLE. The (ARG value of the) subject, on the other hand, is raised to *believes* and assigned the accusative there, but its REALIZED value on the ARG-ST of *like* is not resolved by the VALENCE PRINCIPLE.

It might seem that leaving this value unresolved makes no harm: it must be independently resolved to '−' because, were it resolved to '+', the CASE PRINCIPLE (4.14) would apply to this first NP^{+} argument of the *base* verb *like* and assign it the nominative case, contrary to the assignment of the accusative case to the raised argument of *believes*. However, a more careful examination of this example reveals that leaving the value of REALIZED unresolved would result in a spurious ambiguity. This is because there is one more raising verb in this example, namely *to*, which, following Pollard and Sag (1994, p.143) has the following (partial) lexical entry:

$$(4.21)\quad \left[\begin{array}{ll} \multicolumn{2}{l}{\textit{word}} \\ \textsc{phon} & \text{to} \\ \textsc{ss}|\textsc{loc}|\textsc{cat} & \left[\begin{array}{ll} \textsc{head} & \left[\begin{array}{l} \textit{verb} \\ \textsc{vform}\ \textit{inf} \end{array}\right] \\ \textsc{val} & \left[\begin{array}{l} \textsc{subj}\ \boxed{1}\langle[\textsc{arg}\ \boxed{3}]\rangle \\ \textsc{comps}\ \boxed{2}\langle \mathrm{VP}[\textit{base},\ \textsc{subj}\ \langle[\textsc{arg}\ \boxed{3}]\rangle]\rangle \end{array}\right] \\ \textsc{arg-st} & \boxed{1}\oplus\boxed{2} \end{array}\right] \end{array}\right]$$

According to this specification, *to* is essentially an *inf*initival subject-to-subject raising *verb*: the subject of *like* is not raised directly to the object of *believes*, but it is first raised to the subject position of *to*, and only then is it raised to the object position of *believes*. This means that, again, the subject of *to* is not realized configurationally and, hence, it is not assigned any REALIZED value by the VALENCE PRINCIPLE. This time, however, neither of the two possible REALIZED values can be excluded on independent grounds. If REALIZED is resolved to '−', the NON-CONFIGURATIONAL CASE PRINCIPLE does not apply to this argument and the analysis goes through. If REALIZED is resolved to '+', then the CASE PRINCIPLE does apply, but only vacuously so: it assigns the accusative to the NP^{+} which is the first element on a *verb*[*inf*]'s ARG-ST, thus agreeing with the assignment on the ARG-ST of *believes*. Hence, if nothing more is said, there are actually two analyses of (4.13b).

In order to prevent such spurious ambiguities, we posited the constraint (4.9), repeated below, marking these elements of ARG-ST which are not cancelled from VALENCE attributes as [REALIZED −].[16,17]

[16] This is only an approximation of what (4.9) says. In fact, (4.9) does not deal with unrealized arguments of unembedded phrases.

[17] Recall that F_1 and F_2 range over attributes appropriate for *valence*.

(4.9) $$\textit{valence} \rightarrow \left[\mathrm{F}_1 \ \textit{list}(\begin{bmatrix} \textit{arg} \\ \textsc{arg} \ \begin{bmatrix} \textit{synsem} \\ \textsc{l|c|val|}\mathrm{F}_2 \ \textit{list}(\begin{bmatrix} \textit{arg} \\ \textsc{realized} \ - \end{bmatrix}) \end{bmatrix} \end{bmatrix}) \right]$$

This constraint ensures that the subject of *to* and the subject of *like* are both marked as [REALIZED −] in the following way: When applied to the VALENCE value of the *word believes* (cf. (4.18)) with F_1 = COMPS and F_2 = SUBJ, the SUBJ value of the VP[*inf*] which *believes* subcategorizes for is decreed to be a list of [REALIZED −] *arg*uments. Since this list consists of the subject of the lower verb, *to*, the subject of *to* (and, hence, also the first element of its ARG-ST) is marked as [REALIZED −]. Similarly, when (4.9) is applied to the *word to* with F_1 = COMPS and F_2 = SUBJ, the subject of *like* (hence, also the first element of its ARG-ST) is specified as [REALIZED −]. This way, the arguments of a head which are raised to a higher head are exempt from the CASE PRINCIPLE on their lower occurrence.

Note, however, that (4.9) also exempts from the CASE PRINCIPLE the subjects of the infinitival phrases in, e.g., *[To be] is [to have]*. Since these subjects are not assigned case in any other way, their CASE value is unspecified, which leads to similar spurious ambiguities. Although this problem can be viewed as a part of a much more general problem concerning such never realized subjects (note, for example, that also their CONTENT value is unspecified, which leads to much more serious ambiguities), we will provide in §4.5 a version of our case assignment analysis which deals with such cases (*inter alia*).

Examples (3.47) It should be clear by now that also the examples (3.47), repeated below, which Grover (1995) cited to argue against the strictly lexical approach to case assignment and which, *prima facie*, require a configurational approach to case assignment, can be easily accounted for by our NON-CONFIGURATIONAL CASE PRINCIPLE (4.14).

(3.47) a. It would be possible for him (*he) to be promoted.

b. It was decided that he (*him) be promoted.

c. Him (*he) being promoted made us all glad.

First, although the NP *synsem* corresponding to *him* in (3.47a) is present on ARG-STs of all of *to*, *be* and *promoted*, it is marked as [REALIZED +] only on the ARG-ST of *to*, i.e., a [VFORM *inf*] verb, and it gets the accusative case in accordance with the CASE PRINCIPLE in (4.14).[18]

Similarly, in (3.47b), although *he* is present on ARG-STs of *be* and *promoted*, it is marked as [REALIZED +] only on the ARG-ST of *be*, i.e., a [VFORM *base*] verb, and it receives the nominative case accordingly.

Finally, *him* in (3.47c) is marked as [REALIZED +] only on the ARG-ST of *being*, a [VFORM *grnd*] verb, so it is assigned the accusative case.

[18]For simplicity, we assume here that, in (3.47a), *for* is a sentence marker, i.e., that it takes the whole S[*inf*] as its argument.

4.3.1.2 Extraction

How does the non-configurational analysis presented above interact with extraction? Let us consider examples (4.22) below.

(4.22) a. Who / *Whom do you think __ likes him?

b. Whom do you believe __ to like him?

Assuming the 'traced' analysis of extraction (Pollard and Sag, 1994, ch.4), nothing needs to be added to the analysis above: since the trace is realized configurationally, the VALENCE PRINCIPLE marks the subject of *likes* in (4.22a) and the object of *believe* in (4.22b) as [REALIZED +], and case is assigned exactly like in the examples (4.13a–b).

Assuming a traceless analysis, however, the extracted arguments must be marked as [REALIZED +] at the extraction site by some other mechanism. The most straightforward solution is to make whatever mechanism is responsible for extraction also responsible for marking extracted arguments as [REALIZED +].

For example, Pollard and Sag (1994, ch.9) offer a traceless analysis of extraction in terms of lexical rules, such as (4.23) below (Pollard and Sag, 1994, p.378).[19]

(4.23) COMPLEMENT EXTRACTION LEXICAL RULE:

$$\begin{bmatrix} \text{ARG-ST}\ \langle \ldots, \boxed{3}, \ldots \rangle \\ \text{COMPS}\ \langle \ldots, \boxed{3}[\text{LOC}\ \boxed{1}], \ldots \rangle \\ \text{INHER}|\text{SLASH}\ \boxed{2} \end{bmatrix} \Rightarrow \begin{bmatrix} \text{ARG-ST}\ \langle \ldots, \boxed{4}\begin{bmatrix} \text{LOC}\ \boxed{1} \\ \text{INHER}|\text{SLASH}\ \{\boxed{1}\} \end{bmatrix}, \ldots \rangle \\ \text{COMPS}\ \langle \ldots\ldots \rangle \\ \text{INHER}|\text{SLASH}\ \{\boxed{1}\} \cup \boxed{2} \end{bmatrix}$$

All that needs to be done in order to make this analysis compatible with our analysis of case assignment above is to mark the extracted element, $\boxed{3}$, as [REALIZED +]:[20]

(4.23′) COMPLEMENT EXTRACTION LEXICAL RULE (modified):

$$\begin{bmatrix} \text{ARG-ST}\ \langle \ldots, \boxed{3}, \ldots \rangle \\ \text{COMPS}\ \langle \ldots, \boxed{3}[\text{LOC}\ \boxed{1}], \ldots \rangle \\ \text{INHER}|\text{SLASH}\ \boxed{2} \end{bmatrix} \Rightarrow \begin{bmatrix} \text{ARG-ST}\ \langle \ldots, \boxed{4}\begin{bmatrix} \text{REALIZED}\ + \\ \text{LOC}\ \boxed{1} \\ \text{INHER}|\text{SLASH}\ \{\boxed{1}\} \end{bmatrix}, \ldots \rangle \\ \text{COMPS}\ \langle \ldots\ldots \rangle \\ \text{INHER}|\text{SLASH}\ \{\boxed{1}\} \cup \boxed{2} \end{bmatrix}$$

This lexical rule, when applied to the basic lexical entry of *believe* (with $\boxed{3}$ corresponding to its accusative object), will result in another lexical entry for *believe*, with its accusative object removed from COMPS and marked in ARG-ST as [REALIZED +]. This entry will then be used in (4.22b) and the extracted object will get its accusative case on the ARG-ST of *believe* via reasoning analogous to that for (4.13b) on p.80. Similar considerations, but involving the SUBJECT EXTRACTION LEXICAL RULE, apply to (4.22a).

[19] In agreement with current practice, we renamed SUBCAT as ARG-ST. Recall also that '∪' indicates set union.

[20] Together with Pollard and Sag (1994), we do not specify the full paths here.

Similarly, assuming the more homogeneous traceless analysis of extraction of Bouma *et al.* (1999b), the only change that needs to be made in order to make their analysis compatible with our non-configurational analysis of extraction, is to replace their ARGUMENT REALIZATION principle (4.24) with the modified (4.24′).[21]

(4.24) ARGUMENT REALIZATION:

$$word \rightarrow \begin{bmatrix} \text{SUBJ } \boxed{1} \\ \text{COMPS } \boxed{2} \ominus \textit{list(gap-ss)} \\ \text{DEPS } \boxed{1} \oplus \boxed{2} \end{bmatrix}$$

(4.24′) ARGUMENT REALIZATION (modified):

$$word \rightarrow \begin{bmatrix} \text{SUBJ } \boxed{1} \\ \text{COMPS } \boxed{2} \ominus \textit{list}(\begin{bmatrix} \textit{argument} \\ \text{ARG } \textit{gap-ss} \\ \text{REALIZED } + \end{bmatrix}) \\ \text{DEPS } \boxed{1} \oplus \boxed{2} \end{bmatrix}$$

Below, we will move to more interesting applications of our NON-CONFIGURATIONAL CASE PRINCIPLE.

4.3.2 Optional Argument Attraction in German

Let us consider now the problematic German data concerning optional raising and remote passivization, repeated again below.

(3.27) a. [**Den Wagen** zu reparieren] wurde versucht.
the$_{acc}$ car to fix Aux tried
'It was attempted to fix the car.'

b. [Zu reparieren versucht] wurde **der Wagen** lange Zeit.
to fix tried Aux the$_{nom}$ car long time
'It was attempted to fix the car for a long time.'

In §3.4.2, we saw that these data seem to point towards a *configurational* theory of structural case assignment, but in §4.2.2, we argued that actually the only configurational information necessary here for case assignment is whether a given element of an ARG-ST is realized from this ARG-ST, or whether it is raised to be realized from a higher ARG-ST. Below, we will see that this information really is sufficient.

After Pollard (1994), we assume the following (partial and simplified) lexical entries for *reparieren*,[22] *versucht* and *wurde*:[23]

[21] See Bouma *et al.* (1999b) for *gap-ss* and DEPS.

[22] Pollard (1994) does not give the lexical entry for *reparieren* itself, but we assume that it should be similar to that of *schlagen* 'beat' in all relevant respects.

[23] The feature ERGative singles out unaccusative arguments.

(4.25) *reparieren*:

$$\begin{bmatrix} \textsc{subj}\ \langle \mathrm{NP}[str] \rangle \\ \textsc{comps}\ \langle \boxed{1}\mathrm{NP}[str] \rangle \\ \textsc{erg}\ \langle \boxed{1} \rangle \end{bmatrix}$$

(4.26) *versucht* (nonattraction version):

$$\begin{bmatrix} \textsc{head}\ verb[part] \\ \textsc{subj}\ \langle \mathrm{NP}[str] \rangle \\ \textsc{comps}\ \langle \mathrm{VP}[inf] \rangle \\ \textsc{erg}\ \langle\rangle \end{bmatrix}$$

(4.27) *versucht* (attraction version):

$$\begin{bmatrix} \textsc{head}\ verb[part] \\ \textsc{subj}\ \langle \mathrm{NP}[str] \rangle \\ \textsc{comps}\ \boxed{2}\oplus\boxed{3}\oplus\langle \begin{bmatrix} \textsc{head}\ verb[inf] \\ \textsc{subj}\ \langle \mathrm{NP}[str] \rangle \\ \textsc{comps}\ \boxed{2}\oplus\boxed{3} \\ \textsc{erg}\ \boxed{2} \end{bmatrix} \rangle \\ \textsc{erg}\ \boxed{2} \end{bmatrix}$$

(4.28) *wurde*:

$$\begin{bmatrix} \textsc{head}\ verb[past] \\ \textsc{subj}\ \langle\rangle \\ \textsc{comps}\ \boxed{2}\oplus\boxed{3}\oplus\langle \begin{bmatrix} \textsc{head}\ verb[part] \\ \textsc{subj}\ \langle \mathrm{NP}[str]_{ref} \rangle \\ \textsc{comps}\ \boxed{2}\oplus\boxed{3} \\ \textsc{erg}\ \boxed{2} \end{bmatrix} \rangle \\ \textsc{erg}\ \boxed{2} \end{bmatrix}$$

For simplicity, we will assume that *zu* combines with a *verb*[*base*] and produces a *verb*[*inf*] in the lexicon, but an analysis of *zu* similar to that of English *to* given in Pollard and Sag (1994) also leads to a correct (although slightly longer) analysis of (3.27).

Finally, we assume that the value of ARG-ST is the concatenation of the values of SUBJ and COMPS.

Now, in (3.27a), *zu reparieren* combines first with the object *den Wagen*, so the VALENCE PRINCIPLE marks the occurrence of this object on the ARG-ST of *zu reparieren* as [REALIZED +]. Since this is a non-initial element on this ARG-ST, the CASE PRINCIPLE in (4.11)–(4.12) will assign it the accusative case. Assuming that *wurde* combines with the nonattraction version of *versucht* (4.26), it projects to a phrase satisfying the following description:[24]

(4.29) *wurde versucht* (nonattraction version):

$$\begin{bmatrix} \textsc{head}\ verb[past] \\ \textsc{subj}\ \langle\rangle \\ \textsc{comps}\ \boxed{2}\langle\rangle\oplus\boxed{3}\langle \mathrm{VP}[inf] \rangle \\ \textsc{erg}\ \boxed{2} \end{bmatrix}$$

[24]We assume binary branching for expository purposes only. Nothing hinges on this assumption.

This phrase may then combine with the VP[*inf*] *den Wagen zu reparieren*, as in (3.27a).

On the other hand, assuming that *wurde* combines with the attraction version of *versucht* (4.27), it projects to the following phrase:

(4.30) *wurde versucht* (attraction version):

$$\begin{bmatrix} \textsc{head}\ \textit{verb}[\textit{past}] \\ \textsc{subj}\ \langle\rangle \\ \textsc{comps}\ \boxed{2}\oplus\boxed{3}\oplus\left\langle \begin{bmatrix} \textsc{head}\ \textit{verb}[\textit{inf}] \\ \textsc{subj}\ \langle \text{NP}[\textit{str}]\rangle \\ \textsc{comps}\ \boxed{2}\oplus\boxed{3} \\ \textsc{erg}\ \boxed{2} \end{bmatrix} \right\rangle \\ \textsc{erg}\ \boxed{2} \end{bmatrix}$$

This phrase may then combine with *zu reparieren* (cf. (4.25)), satisfying the following description:

(4.31) *wurde versucht zu reparieren*:

$$\begin{bmatrix} \textsc{head}\ \textit{verb}[\textit{past}] \\ \textsc{subj}\ \langle\rangle \\ \textsc{comps}\ \boxed{2}\langle\boxed{1}\text{NP}[\textit{str}]\rangle\oplus\boxed{3}\langle\rangle \\ \textsc{erg}\ \boxed{2}\langle\boxed{1}\rangle \end{bmatrix}$$

This phrase may, finally, combine with *der Wagen*. Note that here, unlike in the previous example, the object of *reparieren* is realized only from the ARG-ST (= SUBJ ⊕ COMPS) of *wurde*, so it is marked (by the modified VALENCE PRINCIPLE (4.16)) as [REALIZED +] only here. All other NPs on ARG-STs are marked as [REALIZED −] by the principle (4.9) (this is done indirectly, via the mediation of VALENCE attributes). Hence, the object of *reparieren*, initial on the ARG-ST of *wurde*, is assigned the nominative case by (4.11).

4.3.3 Raising Quirky Subjects in Icelandic

It should be clear by now that our analysis deals easily also with the quirky case assignment facts discussed, *inter alia*, by Sag *et al.* (1992), and repeated below.

(3.19) a. **Hann** virðist elska hana.
he$_{nom}$ seems love$_{inf}$ her$_{acc}$
'He seems to love her.'

b. Þeir telja **Maríu** hafa skrifað ritgerðina.
they believe Mary$_{acc}$ have$_{inf}$ written the-thesis
'They believe Mary to have written her thesis.'

(3.20) a. **Hana** virðist vanta peninga.
her$_{acc}$ seems lack$_{inf}$ money
'She seems to lack money.'

b. Hann telur **mig** vanta peninga.
he$_{nom}$ believes me$_{acc}$ lack$_{inf}$ money
'He believes that I lack money.'

(3.21) a. **Barninu** virðist hafa batnað veikin.
the-child$_{dat}$ seems have$_{inf}$ recovered-from the-disease
'The child seems to have recovered from the disease.'

b. Hann telur **barninu** hafa batnað veikin.
he believes the-child$_{dat}$ have$_{inf}$ recovered-from the-disease
'He believes the child to have recovered from the disease.'

(3.22) a. **Verkjanna** virðist ekki gæta.
the-pains$_{gen}$ seems not be-noticeable$_{inf}$
'The pains don't seem to be noticeable.'

b. Hann telur **verkjanna** ekki gæta.
he believes the-pains$_{gen}$ not be-noticeable$_{inf}$
'He believes the pains to be not noticeable.'

These cases are actually handled by the CASE PRINCIPLE for German (4.11)–(4.12) above (p.80), on the assumption that only in (3.19) does the lower verb subcategorize for an NP[*str*] subject, while in (3.20)–(3.22) lower verbs subcategorize for lexical subjects, i.e., NP[*lacc*], NP[*ldat*] and NP[*lgen*], respectively.[25] We leave the detailed analysis of these examples as an easy exercise.

4.4 Similar Approaches

The NON-CONFIGURATIONAL CASE PRINCIPLE presented in this Chapter is, to the best of our knowledge, the first fully worked-out HPSG theory of structural case assignment which does not take recourse to configurational information (i.e., an element's position in syntactic tree) and which is compatible with all current approaches to argument realization, i.e., with both traced and traceless approaches to extraction, and with morphological approach to cliticization. It should be mentioned, though, that a suggestion along similar lines was made in the HPSG literature earlier, by Bratt (1990), who says that "general principles of SUBCAT list provide the case marking... The least oblique NP will be marked nominative, and least oblique NP after that will be marked accusative [in French; A.P.]" (Bratt, 1990, p.11).[26] Unfortunately, Bratt (1990) does not formalize this idea, nor does she examine the interaction of case assignment with raising.

Below, we will briefly consider two other HPSG approaches to case assignment which are similar to ours, i.e., Müller (1997a, 1998a) and Meurers (1999b).

[25]This is not to claim that the CASE PRINCIPLE (4.11)–(4.12) is *generally* valid for Icelandic; in fact, Zaenen and Maling (1983) and Zaenen *et al.* (1985) argue for an analysis according to which, in our terminology, the first NP[*str*] on an ARG-ST is assigned the nominative case, whether this NP is the first element of this ARG-ST, or whether it is preceded by an NP[*lex*]; the subsequent NP[*str*] (if any) should be assigned the accusative case.

[26]This unpublished paper was brought to our attention (by Carl Pollard) only after the theory described above had been formulated and presented as Przepiórkowski (1996b).

4.4.1 Müller (1997a, 1998a)

Müller (1997a), also assuming the by now fairly common divide between structural and lexical cases, presents what he calls CASE PRINCIPLE—CASE ASSIGNMENT ON ARG-ST:

(4.32)
$$\left[\begin{array}{ll}\text{SYNSEM|LOC|CAT|HEAD} & \textit{verb}\\ \text{DTRS} & \left[\begin{array}{l}\textit{head-comp-structure}\\ \text{H-DTR|SYNSEM|LOC|CAT|ARG-ST } \langle \text{NP}[\textit{str}]\rangle \oplus \boxed{1}\end{array}\right]\end{array}\right] \rightarrow \left[\text{H-DTR|SYNSEM|LOC|CAT|ARG-ST } \langle \text{NP}[\textit{snom}]\rangle \oplus \boxed{1}\right]$$

(4.33)
$$\left[\begin{array}{ll}\text{SYNSEM|LOC|CAT|HEAD} & \textit{verb} \vee \textit{adj}\\ \text{DTRS} & \left[\begin{array}{l}\textit{head-comp-structure}\\ \text{H-DTR|SYNSEM|LOC|CAT|ARG-ST } \boxed{1}\textit{nelist} \oplus \langle \text{NP}[\textit{str}]\rangle \oplus \boxed{2}\end{array}\right]\end{array}\right] \rightarrow \left[\text{H-DTR|SYNSEM|LOC|CAT|ARG-ST } \boxed{1} \oplus \langle \text{NP}[\textit{sacc}]\rangle \oplus \boxed{2}\right]$$

What this principle says is that the first NP[*str*] element on the ARG-ST of a verbal *sign* which is projected to a *phrase* gets the nominative case, and all other such NP[*str*]s get the accusative case.

In a way, Müller's (1997a) approach is similar to ours: instead of marking particular arguments as [REALIZED +/−] and resolving case of these arguments only, case is resolved on all arguments of these verbs, which realize at least some of their arguments (i.e., which project to a *phrase*). The important assumption here is that, once a verb projects to a *phrase*, none of its arguments can be raised to a higher verb. To see that this assumption is important, consider a hypothetical subject-to-object raising verb V_1, which, however, raises *only* the subject of a lower verb V_2. If V_2 has an object, it projects to a VP_2 phrase and (4.33) assigns the accusative case to the object (in case it is NP[*str*]). But once (4.33) can apply non-vacuously, so can (4.32), which assigns the nominative case to the subject of VP_2. However, this subject is raised to the object position of V_1, which itself projects to a VP_1. This means, that now (4.33) applies to the higher VP_1, and assigns the accusative to its object. This, of course, results in a case assignment clash.

Another assumption which Müller's (1997a) approach relies on is that all verbs project to *phrase*s, unless they are explicitly subcategorized for as lexical items. That this is a non-trivial assumption can be seen by considering a 1-argument verb whose argument is extracted by means of a lexical rule. Although on standard (Pollard and Sag, 1994) approach, such a *word* still needs to be, vacuously in a sense, projected to *phrase*, a possible alternative would be for a higher verb to directly combine with such a saturated *word*. Such an analysis would be incompatible with the CASE PRINCIPLE (4.32)–(4.33) because the exctracted argument would not be assigned case (i.e., it would be free to bear any CASE value). Similar considerations apply to *word*s whose all arguments are realized as pronominal affixes.

Note also that the CASE PRINCIPLE (4.32)–(4.33) is similar to the case principles of Heinz and Matiasek (1994) and others in being stated as a constraint on configurational structures, which is sometimes viewed as a conceptual problem (see §4.1.1 above).

Where Müller's (1997a) analysis seems to fare better than ours, though, is case assignment to controlled subjects.

On the approach of §4.2, such controlled arguments are marked as [REALIZED −], just like raised arguments, by the principle (4.9) (p.79). Unlike in case of raised arguments, though, their case is not resolved on ARG-ST of a higher predicate: what is structure-shared in case of control is only the INDEX value of the NP, not the whole *synsem*. Thus, the CASE value of such controlled arguments is not resolved anywhere in the grammar, which at best leads to spurious ambiguities, and at worst is empirically false.

Höhle (1983), cited here after Müller (1998a), provides interesting arguments that controlled subjects in German do, in fact, receive the nominative case. The argument is based on the case agreement between an NP and the adverbial *ein- nach d- ander-* 'one after the other, in turns':[27]

(4.34) a. Einer nach dem anderen haben wir die Burschen runtergeputzt.
one$_{nom}$ after the other Aux we$_{nom}$ the$_{acc}$ lads$_{acc}$ scolded
'We took turns in bringing the lads down a peg or two.'

b. Einen nach dem anderen haben wir die Burschen runtergeputzt.
one$_{acc}$ after the other Aux we$_{nom}$ the$_{acc}$ lads$_{acc}$ scolded
'One after the other, we brought the lads down a peg or two.'

In (4.34a), *einer nach dem anderen* modified the subject *wir*, with which it also agrees in the nominative case (and in gender), while in (4.34b), *einen nach dem anderen* modifies the accusative object and must itself bear the accusative case.

On the basis of this observation, we can (after Höhle (1983) and Müller (1998a)) infer that controlled subjects in German bear the nominative case:

(4.35) Ich habe den Burschen geraten, im Abstand von wenigen Tagen einer nach dem anderen zu kündigen.
I Aux [the lads]$_{acc}$ advised in interval of several days [one after the other]$_{nom}$ to give notice
'I advised the lads to hand in their notice one after the other at intervals of a few days.'

In (4.35) above, the adverbial *einer nach dem anderen* bears the nominative case and it semantically modifies the subject of *zu kündigen*, controlled by the higher (accusative) object, *den Burschen*, so—on the most straightforward analysis—the unrealized subject itself must bear the nominative case. Our revised NON-CONFIGURATIONAL CASE PRINCIPLE, presented below in §4.5, will correctly deal with such cases.

4.4.2 Meurers (1999b)

Another approach similar to ours, less so in name, but more so in actual content, is that of Meurers (1999b).[28]

[27] Translations of all examples come from Müller (1998a).

[28] An earlier version of this study contained a detailed discussion of the analysis of Meurers (1999b), but, since that analysis has been in flux during writing and revising this thesis, we decided to just briefly discuss it in general terms instead.

Meurers (1999b) builds on empirical observations of Haider (1990), Grewendorf (1994) and Müller (1997b), and considers fronting of constituents consisting of an infinitival VP and its subject, cf. (4.1)–(4.2) (Meurers, 1999b, p.7), repeated below.

(4.1) [**Ein Außenseiter** gewinnen] wird hier nie.
an$_{nom}$ outsider win$_{inf}$ will here never
'An outsider will never win here.'

(4.2) [**Einen Außenseiter** gewinnen] läßt Gott hier nie.
an$_{acc}$ outsider win$_{inf}$ lets god here never
'God never lets an outsider win here.'

As discussed in §4.1.1, such examples are problematic for the configurational case assignment approach such as that of Heinz and Matiasek (1994) because, in both (4.1) and (4.2), the NP *ein(en) Außenseiter* is realized as the subject of the infinitival verb *gewinnen*, so it should bear the nominative case, and yet it receives the nominative case in (4.1) but the accusative in (4.2).[29]

Note that examples (4.1)–(4.2) are equally problematic for our analysis, based on the notion of realizedness. Since *ein(en) Außenseiter* is realized as the subject of *gewinnen*, it is marked as [REALIZED +] on the ARG-ST of *gewinnen* and assigned the nominative case (because it is the first element of this ARG-ST). Adopting the analysis of Meurers (1999b), this ARG-ST element is then raised to the higher ARG-ST, where—in case of (4.2)—it is assigned the accusative case, which results in case clash. In §4.5 we will revise our NON-CONFIGURATIONAL CASE PRINCIPLE to deal with such cases.

The intuition behind the analysis that Meurers (1999b) proposes is that, roughly, although *ein(en) Außenseiter* is realized as the subject of *gewinnen*, it is not cancelled from the SUBCAT list; instead, it is raised to the higher verb, albeit marked as realized in order to prevent multiple realization of a single argument. Case is then assigned to a [CASE *str*] element on the highest SUBCAT list, on which this element occurs.

The crucial similarity between this analysis and the one presented in §4.2 above is that both analyses are non-configurational in the sense of assigning case on the basis of the position in SUBCAT/ARG-ST,[30] and not on the basis of configurational (DTRS) information. Note that this feature sets these analyses apart from all other HPSG analyses of structural case assignment considered in §3.4. However, the important difference between these two analyses is that, while the analysis of §4.2 assumes that the SUBCAT/ARG-ST from which an element is realized is always the highest SUBCAT/ARG-ST on which this element is present, Meurers (1999b) argues that this does not have to be the case, i.e., that an element realized from a SUBCAT may still, under certain circumstances, raise to a higher SUBCAT.

This observation is the basis of a revision of our analysis, to which we turn presently.

[29]Recall the implicit assumption here, i.e., that the material before the finite verb must be a single constituent.

[30]Note that Meurers (1999b) uses SUBCAT in the way similar to Pollard and Sag (1994, ch.1–8), i.e., as a conflation of VALENCE and ARG-ST.

4.5 Non-Configurational Case Principle Revised

In the previous section, we briefly presented two approaches to case assignment similar to ours. In particular, we looked at two phenomena which our theory of structural case assignment cannot straightforwardly handle, i.e., case assignment to controlled subjects in German (cf. (4.35) on p.91) and some special instances of case assignment to (raised) subjects of infinitives, also in German (cf. (4.1)–(4.2)).

The problem with the theory of §4.2 is that, although it rightly assumes that case should be assigned to an argument on the highest ARG-ST on which it occurs, it wrongly assumes that this highest ARG-ST is exactly the ARG-ST from which the argument is realized, i.e., cancelled (from the corresponding VALENCE) by the VALENCE PRINCIPLE, or extracted, or turned into a pronominal affix. The two problematic cases are exactly instances where the latter assumption is violated: controlled subjects are never realized, so, in particular, the highest ARG-ST on which they occur is not an ARG-ST from which they are realized, and, assuming the essential correctness of the 'raising spirits' analysis of Meurers (1999b), raised arguments may be realized from an intermediate ARG-ST, although they still receive case on the basis of their position on the highest ARG-ST on which they occur.

This observation calls for a revision of our NON-CONFIGURATIONAL CASE PRINCIPLE. We adopt here the insight of Meurers (1999b) and assume the priority of raising information over realization information in assigning case. Thus, instead of marking each element of ARG-ST as [REALIZED +/−], we will mark it as [RAISED +/−]: roughly, an element of ARG-ST is [RAISED +] if and only if it occurs also on a higher ARG-ST (actually, on the immediately higher ARG-ST). Case will now be assigned only to [RAISED −] arguments.

Note that this revision does not affect the phenomena considered in §4.3: in all those cases, the arguments were realized from the highest ARG-ST, so [REALIZED +] corresponded exactly to our current [RAISED −]. However, in the problematic cases considered by Müller (1998a) (on the basis of the data from Höhle (1983)) and by Meurers (1999b), the revised approach fares better. First, controlled subjects do not occur on higher ARG-STs, so they are marked as [RAISED −] and the (slightly revised) CASE PRINCIPLE applies to them assigning the nominative case. Second, although subject of *gewinnen* in (4.1)–(4.2) is realized from the ARG-ST of *gewinnen*, it is marked there as [RAISED +] because it is raised to a higher ARG-ST (appropriately marked, as in Meurers (1999b), in order to prevent multiple realization). This argument is marked [RAISED −] only on the ARG-ST of the highest verb, *wird* in (4.1) and *läßt* in (4.2), and it is assigned case, nominative and accusative, respectively, only there.

4.5.1 Formally

Our new NON-CONFIGURATIONAL CASE PRINCIPLE will differ from that of §4.2.3 only in replacing [REALIZED +] with [RAISED −]. For example, a part of the case principle for German can be stated formally as in (4.36)–(4.37) (compare with (4.11)–(4.12)).

(4.36) $$\begin{bmatrix} \textit{cat} \\ \text{HEAD}\ \textit{verb} \\ \text{ARG-ST}\ \left\langle \begin{bmatrix} \text{ARG}\ \text{NP}[\textit{str}] \\ \text{RAISED}\ - \end{bmatrix} \right\rangle \oplus \boxed{2} \end{bmatrix} \rightarrow \begin{bmatrix} \text{ARG-ST}\ \left\langle \begin{bmatrix} \text{ARG}\ \text{NP}[\textit{snom}] \end{bmatrix} \right\rangle \oplus \boxed{2} \end{bmatrix}$$

(4.37)
$$\begin{bmatrix} \textit{cat} \\ \text{HEAD } \textit{verb} \\ \text{ARG-ST } \boxed{1}\textit{nelist} \oplus \left\langle \begin{bmatrix} \text{ARG NP}[\textit{str}] \\ \text{RAISED } - \end{bmatrix} \right\rangle \oplus \boxed{2} \end{bmatrix} \rightarrow \begin{bmatrix} \text{ARG-ST } \boxed{1} \oplus \left\langle \begin{bmatrix} \text{ARG NP}[\textit{sacc}] \end{bmatrix} \right\rangle \oplus \boxed{2} \end{bmatrix}$$

Of course, this presupposes the relevant change in the signature:

(4.38)
$$\begin{bmatrix} \textit{argument} \\ \text{ARGUMENT } \textit{synsem} \\ \text{RAISED } \textit{bool} \end{bmatrix}$$

(4.39)
$$\begin{bmatrix} \textit{category} \\ \text{VALENCE} \begin{bmatrix} \text{SUBJECT } \textit{list(argument)} \\ \text{SPECIFIER } \textit{list(argument)} \\ \text{COMPLEMENTS } \textit{list(argument)} \end{bmatrix} \\ \text{ARGUMENT-STRUCTURE } \textit{list(argument)} \end{bmatrix}$$

What will differ more considerably from the previous version of our analysis is the way RAISED values are assigned. Informally, an element of ARG-ST is [RAISED +] if and only if it occurs on the immediately higher ARG-ST. More precisely, an element of ARG-ST of some *sign* is [RAISED +] if and only if there is an ARG-ST which contains both an argument whose ARG value is structure-shared with the ARG value of this element, and a (*synsem* of a) projection of this *sign*. Formally, we will posit the following global constraint:[31]

(4.40)
$$\begin{array}{l} \textit{unembedded-sign} \rightarrow \\ \quad (\forall \boxed{0}, \boxed{1}, \boxed{2}, \boxed{3} \; (\boxed{0} \begin{bmatrix} \textit{category} \\ \text{HEAD } \boxed{1} \\ \text{ARG-ST } \boxed{2} \end{bmatrix} \wedge \texttt{member}(\boxed{3}[\text{ ARG } \boxed{4}\,], \boxed{2}) \rightarrow \\ \qquad (\boxed{3}[\text{ RAISED } +\,] \leftrightarrow \\ \qquad\quad \exists [\text{ ARG-ST } \boxed{5}\,] \\ \qquad\quad (\texttt{member}([\text{ ARG } \boxed{4}\,], \boxed{5}) \wedge \texttt{member}([\text{ ARG}|\text{LOC}|\text{CAT}|\text{HEAD } \boxed{1}\,], \boxed{5}))))) \end{array}$$

In words:

(4.41) In an unembedded sign (i.e., corresponding to an utterance),
for each *category* object in this sign with [HEAD $\boxed{1}$] and [ARG-ST $\boxed{2}$],
for each element $\boxed{3}$[ARG $\boxed{4}$] on $\boxed{2}$,
this element is [RAISED +] iff
there is an ARG-ST containing an element with the same
[ARG $\boxed{4}$] and containing also an element with the [HEAD $\boxed{1}$].

This constraint is formulated with as few hidden assumptions as possible, so that it can be used with various assumptions about constituent structure and the relation between VALENCE and ARG-ST. We will conclude this section with a brief comparison of this revised version of our case theory with the original version presented in §4.2.

[31] This constraint is stated here in quasi-RSRL (Relational Speciate Re-entrant Logic; Richter (1997, 1999b); Richter *et al.* (1999)); see Appendix A for complete formalization.

4.5.2 Some Comparisons

Note first that the principle responsible for assigning RAISED values is conceptually much simpler than the relevant parts of our original analysis responsible for assigning REALIZED values. There, we had the rather complex (at least when rigidly formalized) principle (4.9), marking raised elements as [REALIZED −] on their lower occurrence, as well as three additional principles assigning [REALIZED +] to elements realized in three different ways, cf. (4.6)–(4.8) above.[32] Here, we have instead just the single principle (4.40), taking care of all these instances. The other side of this conceptual simplicity, though, is that the principle (4.40) taking care of RAISED values is much less local then the corresponding parts of our earlier analysis. In fact, (4.40) is stated as a constraint on *unembedded-sign*s, i.e., on objects corresponding to complete utterances. Note, however, that 1) although global, this principle is not configurational, i.e., it does not refer to syntactic (DTRS) configurations, and 2) the CASE PRINCIPLE itself (i.e., constraints such as (4.36) and (4.37)) is both non-configurational and local: it is stated as a (set of) constraint(s) on *category*, and it refers only to values of HEAD and ARG-ST.

Moreover, this revised analysis is free from a certain potential technical problem present in the previous analysis. We assumed there (cf. (4.8) on p.79) that arguments whose ARG value is an *affix* must be [REALIZED +], i.e., are subject to the CASE PRINCIPLE. However, according to the analysis of Abeillé *et al.* (1998b), such *affix* arguments also may (in some cases must) be raised to a higher verb, where they are again marked as [REALIZED +]. This means that they can be assigned case on a number of ARG-STs, which is potentially problematic. On the revised version, however, only the highest occurrence of an *affix* argument is marked as [RAISED −], so it can be assigned structural case only here.

Note also that the revised analysis correctly assigns the nominative case to controlled subjects: since their *synsem* does not appear (as the value of ARG) on a higher ARG-ST, they are marked as [RAISED −] and assigned the nominative (by (4.36)), in accordance with the arguments from Höhle (1983) and Müller (1998a). Actually, this analysis fares better than Müller's (1997a) in this respect because it correctly assigns case to controlled subjects of verbs which never project to a phrase, as in so-called coherent constructions (see Müller (1998a, §8.2) for discussion), problematic for Müller's (1997a) CASE PRINCIPLE exactly because of the traces of configurationality in its formalization, see (4.32)–(4.33).[33]

4.6 Conclusions

In this largely theory-internal Chapter we developed a general HPSG approach to case assignment which builds (but also significantly improves) on previous such approaches. We argued that the only viable locus of case assignment within the current set of HPSG assumptions is ARG-ST (or DEPENDENTS, assuming the architecture of Bouma *et al.* (1999b)) and we showed in detail that, contrary to appearances, case assignment on ARG-ST, without any reference to

[32] Moreover, these three 'principles' were of different nature: one of them was hard-wired into the VALENCE PRINCIPLE, another one into extraction lexical rules, and the third one characterized *affix* arguments as [REALIZED +].

[33] Such coherent constructions are problematic also for earlier case assignment analyses, such as Pollard (1994) and Heinz and Matiasek (1994), essentially for the same reasons.

syntactic tree-configuration, is possible and, actually, leads to an elegant case theory.

Our analysis of structural case assignment consists of the following components:

- a language-specific type hierarchy like that in Heinz and Matiasek (1994) (see (3.32) on p.64), i.e., distinguishing between structural and lexical cases;
- a slightly extended structure of elements of ARG-ST (and, not crucially, VALENCE attributes) consisting now of the *synsem*-valued ARG and the *boolean* RAISED, see (4.38)–(4.39);
- a principle marking arguments raised to higher ARG-STs as [RAISED +], and other arguments as [RAISED −], see (4.40);
- an actual (and language-specific) CASE PRINCIPLE, assigning case to [RAISED−] elements of ARG-ST, see (4.36)–(4.37) for a candidate for (a part of) such a principle for German.

Additionally, the VALENCE PRINCIPLE, as well as other principles referring to elements of VALENCE attributes and ARG-ST, need to be slightly (and trivially) modified.

Note that some parts of this analysis are contingent and other are necessary. For example, we consider assignment on ARG-ST (or a similar attribute) to be a necessary feature of any homogeneous HPSG theory of structural case assignment. On the other hand, the attribute RAISED is disposable: the principle (4.40), marking arguments as [RAISED +/−], could be hard-wired into the CASE PRINCIPLE proper.

Before concluding this Chapter, we will mention some highlights of the approach developed above:

- **generality**: the approach described above can be applied to a wide range of data from various languages;
- **modularity**: unlike previous approaches, the approach developed above is independent of various analyses of argument realization, in particular, it is orthogonal to the issue of traced vs. traceless extraction and it is compatible with analyses of Romance cliticization as affixation;
- **conceptual coherence**: our analysis of case assignment satisfies various conceptual postulates found in the literature:
  - it is **non-configurational** (Pollard, 1994);
  - it is, to a large extent, **local** (Blake 1994 and inherited wisdom in general);
  - case assignment is based on **obliqueness / grammatical function hierarchy** (Zaenen *et al.*, 1985; Yip *et al.*, 1987; Maling, 1993).
- **non-redundancy**: case assignment generalizations are stated only once in the grammar.

Moreover, as we will see in the second Part of this study, our analysis of case assignment trivially extends to non-argument NPs.

In the next Chapter, we will apply this approach to a range of case assignment phenomena in Polish.

Chapter 5

Case in Polish

Polish is a perfect testbed for any general theory of case assignment: it has seven morphological cases, listed below, and a number of interesting morphological, morphosyntactic and semantic case phenomena.

(5.1) The morphological cases in Polish:

- nominative;
- accusative;
- genitive;
- dative;
- instrumental;
- locative;
- vocative.

Of these seven morphological cases, we will exclude the vocative case from our considerations as it is used exclusively extra-sententially, for addressing:[1]

(5.2) Mario, chodź!
Mary$_{voc}$ come
'Come, Mary.'

(5.3) Sezamie, otwórz się!
Sesame$_{voc}$ open RM
'Open, sesame!'

Also locative, whose distribution is limited to objects of certain prepositions will only rarely be mentioned below.

But even if we limited our attention to the remaining five cases, it would be impossible to give a full account of their distribution in Polish in a single study, not to mention a single

[1] See Andrejewicz (1988), as well as Krzyżanowski (1995) and references therein.

chapter therein. Since case plays such a central rôle in Polish grammar, and its distribution is conditioned by a variety of not only syntactic and semantic, but also pragmatic and morphophonological factors, such a complete account would have to presuppose no less than a complete description of Polish.

For this reason, we will restrict our considerations to syntactic aspects of case, so, for example, we will not deal with the so-called semantic case (e.g., the 'ethical' dative), or with morphophonological case syncretisms (e.g., the syncretism of accusative and genitive in masculine gender). But even when restricting our attention to syntactic case, we have to choose from a plethora of interesting phenomena.

Below, we will consider in detail three case phenomena in Polish: Genitive of Negation (§5.2), complex case patterns in numeral phrases (§5.3), and case agreement between an NP and an adjectival predicate (§5.4). In all three cases, we will considerably extend the empirical domain of previous analyses and we will reach new, often *prima facie* controversial, generalizations. On the other hand, among the phenomena conspicuous in this Chapter by their absence will be: case assignment and case agreement in comparative constructions, case assignment properties of the distributive *po* (which might be recognized as calling for an extension of the above list of cases in Polish), and case assignment properties of nominals, including those of so-called verbal nouns (gerunds). We hope to come back to these issues in future research.

However, before we can deal with any syntactic case phenomena in Polish, we have to investigate the nature of the structural vs. inherent (lexical) dichotomy in Polish; this is the task of the first section of this Chapter.[2]

5.1 Structural and Inherent Case in Polish

Before we move to empirical and analytical considerations, a terminological note is in order. Just as in the previous two Chapters, we use the term *structural case* in accordance with historical (in)accuracy, but without committing ourselves to any configurationality of structural cases; on the contrary, as extensively discussed in the previous Chapter, structural case assignment should be analysed as non-configurational.

Moreover, we use the terms *inherent case* and *lexical case* interchangeably.

Finally, we consciously overload the terms *structural* and *lexical* (or *inherent*); thus, we will speak not only of *structural cases*, but also of *structural NPs* (NPs marked with a structural case) and *structural positions* (syntactic positions occupied by structural NPs). We hope that this will not lead to any confusion.

5.1.1 Irrelevance of Passivization

The structural vs. inherent case dichotomy as construed in GB was first applied to Polish by Tajsner (1990) and Willim (1990). For Willim (1990, p.214), inherent cases are dative, associated with the θ-role Goal, instrumental, when associated with the θ-role Source, and

[2] Sections 5.1.2–5.1.4, 5.2.1 and 5.3 are based on and considerably extend Przepiórkowski (1996a).

genitive, when associated with the θ-role Source (or Cause) or Goal (or Target). Other cases assigned by verbs to their complements are structural (specifically, objective). For example, the instrumental of the object of *kierować* 'manage, run' in (5.4) and the genitive of the complement of *nienawidzić* 'hate' in (5.5) are structural.

(5.4) Jan kieruje fabryką.
John manages factory$_{ins}$
'John manages (a/the) factory.'

(5.5) Jan nienawidzi Marii.
John hates Mary$_{gen}$
'John hates Mary.'

According to Willim (1990), verbs such as *kieruje* and *nienawidzi* specify their complements as bearing structural instrumental and structural genitive, respectively, while verbs taking accusative complements specify them as structural only, and the accusative is realized by a default ('redundancy') rule. What is common to all structural complements, including those realized as instrumental or genitive, is that they can be passivized, e.g.:

(5.6) Fabryka jest kierowana przez Jana.
Factory$_{nom}$ Aux manage$_{passp}$ by John
'The factory is run by John.'

(5.7) Maria jest nienawidzona przez Jana.
Mary$_{nom}$ Aux hate$_{passp}$ by John
'Mary is hated by John.'

On the other hand, Tajsner (1990, pp.67–70) applies the Genitive of Negation test to show that dative and instrumental are assigned at D-structure, i.e., are always inherent, while accusative, genitive (of negation) and nominative are assigned at S-structure, i.e., are structural:

(5.8) a. Lubię Marię.
like$_{1st,sg}$ Mary$_{acc}$
'I like Mary.'

b. Nie lubię Marii / *Marię.
NM like$_{1st,sg}$ Mary$_{gen}$ / Mary$_{acc}$
'I don't like Mary.'

(5.9) a. Pomogłem Janowi.
helped$_{1st,sg,masc}$ John$_{dat}$
'I helped John.'

b. Nie pomogłem *Jana / Janowi.
NM helped$_{1st,sg,masc}$ John$_{gen}$ / John$_{dat}$
'I didn't helped John.'

(5.10) a. Kieruję firmą.
manage$_{1st,sg}$ factory$_{ins}$
'I run (a/the) factory.'

b. Nie kieruję *firmy / firmą.
NM manage$_{1st,sg}$ factory$_{gen}$ / factory$_{ins}$
'I don't run (a/the) factory.'

(5.11) a. Książki są na stole.
books$_{nom}$ are on table
'(The) books are on (the/a) table.'

b. Książek nie ma na stole.
books$_{gen}$ NM has on table
'(The) books are not on (the/a) table.'

The assumption behind this test is that, once inherent cases are assigned at D-structure, no syntactic process can override them (cf. (5.9)–(5.10) above), while, on the other hand, structural cases depend on the structural environment and, hence, may depend on, e.g., whether the verb is negated or not (see (5.8) and (5.11)).

The important difference between the structural / inherent case dichotomy approaches of Willim (1990) and Tajsner (1990) is that the former relies mainly on θ-role assignment (and, implicitly, on passivization), while the latter relies on the stability of case markings in changing environments.[3] This results in two different classifications: for example, the instrumental complement of *kierować* 'manage, run' is classified as structural by Willim (1990) (see (5.4) and (5.6) above) and as inherent by Tajsner (1990) (see (5.10) above). Which approach to the structural / inherent dichotomy should we adopt?

For a number of reasons, we will assume Tajsner's (1990) strategy. First, it is much preferable methodologically: case variations depending on syntactic environment are easily observable, i.e., the data are reasonably clear. On the other hand, it is still far from clear in generative theorizing what θ-roles we need and how to assign particular arguments to particular θ-roles, short of doing that in a purely intuitive (read: fallible) way.

Second, the correlation between θ-role assignment and passivization suggested by Willim (1990) cannot be maintained in the present form. The prediction is that instrumental complements not associated with the θ-role Source and genitive complements not associated with Source (or Cause) or Goal (or Target) are passivizable. The data below show that this prediction is false:

(5.12) a. Jan macha chorągiewką.
John waves banner$_{ins}$
'John is waving a/the banner.'

b. *Chorągiewka jest machana (przez Jana).
banner$_{nom}$ Aux wave$_{passp}$ by John
'A/The banner is (being) waved (by John).' (intended)

[3]This difference is reminiscent of the difference between the approaches of Chomsky (1986a) and Haider (1985) discussed in §3.2.1.

(5.13) a. Jan chwali się dobrą oceną.
John boasts RM good$_{ins}$ mark$_{ins}$
'John boasts of a good mark.'

b. *Dobra ocena jest chwalona (się) (przez Jana).
good$_{nom}$ mark$_{nom}$ Aux boast$_{passp}$ RM by John
'Good mark is boasted of by John.' (intended)

(5.14) a. On gardzi ocenami.
he scorns marks
'He doesn't care about marks.'

b. *Oceny są gardzone (przez niego).
marks$_{nom}$ Aux scorn$_{passp}$ by him
'(Good) marks are scorned by him.' (intended)

(5.15) a. Ten rozdział dotyczy przypadka.
this chapter is about case$_{gen}$
'This chapter is concerned with case.'

b. *Przypadek jest dotyczony (przez ten rozdział).
case$_{nom}$ is being about$_{passp}$ by this chapter
'Case is the topic of this chapter.' (intended)

(5.16) a. Jan potrzebuje pieniędzy.
John needs money$_{gen}$
'John needs money.'

b. *Pieniądze są potrzebowane (przez Jana).
money Aux need$_{passp}$ by John
'Money is needed (by John).' (intended)

(5.17) a. Jan unika sławy.
John avoids fame$_{gen}$
'John avoids fame.'

b. *Sława jest unikana (przez Jana).
fame$_{nom}$ Aux avoid$_{passp}$ by John
'Fame is avoided (by John).' (intended)

In none of (5.12)–(5.14) is the instrumental complement a source in any intuitive sense, so it should be classified as structural and passivization should be allowed, contrary to facts. Similarly, although none of the genitive complements in (5.15)–(5.17) can be construed as source, cause, goal or target, passivization is impossible.

Moreover, it was noted as early as in Zabrocki (1981, pp.124–125) that some dative complements, always lexical on Willim's (1990) account, actually can be passivized:

(5.18) a. Imperialiści zagrozili pokojowi.
imperialists threatened peace$_{dat}$

'Imperialists threatened the peace.'

b. Pokój został zagrożony przez imperialistów.
peace$_{nom}$ Aux threaten$_{passp}$ by imperialists
'The peace was threatened by imperialists.'

(5.19) a. Zaufałem temu przyjacielowi.
trust$_{1st,sg,masc}$ this$_{dat}$ friend$_{dat}$
'I trusted this friend.'

b. zaufany przyjaciel$_{nom}$
trust$_{passp,nom}$ friend$_{nom}$
'trusted friend'

c. ?Ten przyjaciel jest zaufany.
this$_{nom}$ friend$_{nom}$ Aux trust$_{passp}$
'This friend is trusted.'

Thus, Willim's (1990) classification of arguments into structural and inherent according to the θ-role they receive is orthogonal to passivization and to case assignment.[4]

Below, we will modify, extend and better motivate the approach to the structural / lexical case dichotomy based on the stability of an argument's case across syntactic environments.

5.1.2 Genitive of Negation

Accusative is Structural, Dative and Instrumental are Lexical In Polish, unlike in Russian, Genitive of Negation is, at least at first sight, a fairly simple phenomenon: an otherwise accusative complement of a verb must be realized as genitive when the verb is negated, as in (5.8) above, while other complements do not change their case under negation, cf. (5.9)–(5.10) above. Thus, together with Tajsner (1990), we may conclude that at least some occurrences of accusative are structural, and at least some occurrences of dative and instrumental are lexical. In fact, there seem to be no verbs taking dative or instrumental complements and allowing these complements to be genitive under negation. Thus, we conclude that ad-verbal dative and instrumental are always lexical.

May Accusative Be Lexical? The situation is a little more complicated with respect to accusative objects. Although it is usually claimed (e.g., by Saloni and Świdziński (1985, p.141), Tajsner (1990), Willim (1990, p.211), Dziwirek (1994, p.150), Franks (1995, p.202), Przepiórkowski (1996a), Witkoś (1996a, pp.69ff.), Saloni and Świdziński (1998, p.156)) that all accusative complements must undergo GoN, Buttler *et al.* (1971, p.307) and Holvoet (1991, pp.94–97) note apparent exceptions to this generalization:

(5.20) a. Głowa ją boli.
head$_{nom}$ she$_{acc}$ aches

[4] See Zabrocki (1981) for convincing arguments that passivization in Polish is a fully lexical phenomenon.

'Her head is aching.'

b. Głowa już ją / jej nie boli.
head$_{nom}$ already she$_{acc/gen}$ NM aches
'Her head isn't aching any more.'

(5.21) a. Stać ją było na kupno samochodu.
afford she$_{acc}$ Aux on buying car
'She could afford buying a car.'

b. Nie stać ją / jej było na kupno samochodu.
NM afford she$_{acc/gen}$ Aux on buying car
'She couldn't afford buying a car.'

(5.22) a. To ją kosztowało majątek.
this$_{nom}$ she$_{acc}$ cost fortune$_{acc}$
'This cost her a fortune.'

b. To ją / jej nie kosztowało ani grosza.
this$_{nom}$ she$_{acc/gen}$ NM cost even penny$_{gen}$
'This didn't cost her as much as a penny.'

The status of these data is far from clear. All speakers we consulted allow both the accusative and the genitive in b. examples, although older speakers seem to prefer the accusative, while younger speakers prefer the genitive. These data may be interpreted in two ways: either the principle of the grammar responsible for the Genitive of Negation is optional in case of some verbs, or these verbs may optionally take the lexical accusative. Since we do not have any empirical arguments favouring either of these two alternatives, we will opt below for the second possibility, as leading to simpler case assignment rules.

Genitive of Negation is Structural If we assume that ad-verbal accusative is (almost) always structural because it changes to genitive under negation, then, by the same reasoning conducted in the opposite direction, the genitive of negation must be taken to be a structural case: it changes to accusative once negation is removed.

What About Nominative? Finally, within GB and MP, facts such as (5.11), repeated below, are taken as an argument for the structurality of the nominative subject of the existential/locational copula *być* (Willim, 1990; Tajsner, 1990; Witkoś, 1996a, 1999).

(5.11) a. Książki są na stole.
books$_{nom}$ are on table
'(The) books are on (the/a) table.'

b. Książek nie ma na stole.
books$_{gen}$ NM has on table
'(The) books are not on (the/a) table.'

This argument (but not the conclusion it leads to, as we will see below) is, however, problematic. One problem it faces is: Why is it only the subject of the existential/locational copula that changes to genitive under negation, and not subjects of other verbs?

(5.23) a. Jan jest szczęśliwy.
John$_{nom}$ is happy$_{nom}$
'John is happy.'

b. *Jana nie ma/jest szczęśliwego/szczęśliwy.
John$_{gen}$ NM has/is happy$_{gen/nom}$
'John is not happy.' (intended)

(5.24) a. Jan przyszedł.
John$_{nom}$ came
'John came.'

b. *Jana nie przyszedł/przyszło.
John$_{gen}$ NM came$_{masc/neut}$
'John didn't come.' (intended)

It actually seems clear that the negated existential/locative copula is present in the lexicon rather than being derived from the positive copula via productive syntactic rules. In fact, there is some evidence that in Polish the negative particle *nie* always attaches to a verb already in the lexicon, see Witkoś (1998, §4.4) and, especially, Kupść and Przepiórkowski (1999) (see §5.2.2.1 below). In the particular case of existential/locational copula, its negation is idiosyncratic in a number of respects: not only does the negation change the case of the subject to genitive, but it also changes the morphology of the verb (from *jest* to *ma*), and, as noted by Dziwirek (1994), it probably demotes the subject, as the binding test shows (Dziwirek, 1994, p.154):[5,6,7]

(5.25) a. Jan$_i$ był u siebie$_i$ / *niego$_i$ w domu.
John$_{nom}$ was at himself / him at home
'John was at his place, at home.'

b. Jana$_i$ nie było u ??siebie$_i$ / ?niego$_i$ w domu.
John$_{gen}$ NM was at himself / him at home
'John wasn't at his place, at home.'

Also consideration of control into adverbial clauses, generally allowed only for subject controllers, leads to the same conclusion, as noted by Witkoś (1999):[8]

(5.26) a. ?Skończywszy pracę wcześniej, Ewa była teraz w domu.
finish$_{advp}$ work earlier Eve$_{nom}$ was now at hom

[5]Recall that in Polish reflexive anaphors must be bound by the subject.

[6]For Dziwirek (1994), the reflexive version of examples such as (5.25b) is clearly ungrammatical, and the pronominal version is clearly acceptable.

[7]See also Babby (1980a) for a careful defence of a similar conclusion with respect to the Russian existential copula.

[8]Similar facts are also discussed in Dziwirek (1991) (and cited in Franks (1992, p.5), Franks (1993, p.514) and Franks (1995, p.66)), but apparently not in its revision Dziwirek (1994).

'Having finished work earlier, Eve was now at home.'

b. *Skończywszy pracę później, Ewy nie było jeszcze w domu.
finish$_{advp}$ work later Eve$_{gen}$ NM was yet at home
'Having finished work later, Eve was not at home yet.' (intended)

Finally, such demoted subjects, unlike true subjects, cannot control a *mimo* 'despite'-adverbial:[9]

(5.27) *Mimo poważnej choroby, Janka nie było w domu.
despite serious illness John$_{gen}$ NM was at home
'Despite serious illness, John was not at home.' (intended)

Now, if—as strongly suggested by its high idiosyncraticity—the negated form of the existential/locative copula comes from the lexicon, then it cannot be used as an argument for the structurality of the genitive case on the subject: the genitive case may instead be interpreted as one more lexical idiosyncrasy of the negated copula. Nevertheless, as we will see below (§5.1.3), the tradition of treating the nominative case of the subject as structural should not be given up.

Genitive Arguments Note, by the way, that the Genitive of Negation does not tell us anything about the structural/lexical status of genitive arguments, as in the examples below:

(5.28) a. Janek boi się burzy.
John$_{nom}$ fears RM tempest$_{gen}$
'John is afraid of the tempest.'

b. Janek nie boi się burzy.
John$_{nom}$ NM fears RM tempest$_{gen}$
'John is not afraid of the tempest.'

(5.29) a. Janek nienawidzi klasówek.
John$_{nom}$ hates class-tests$_{gen}$
'John hates class-tests.'

b. Janek nie nienawidzi klasówek.
John$_{nom}$ NM hates class-tests$_{gen}$
'John does not hate class-tests.'

The fact that these genitive arguments retain their genitive case under negation is consistent with both the position that they are lexical (they do not change their case) and the position that they are structural (like other structural complements, they are genitive under negation).[10]

[9]This datum is from Dziwirek (1991), cited here after Franks (1992, 1993, 1995).

[10]In fact, we will argue below (pp.141–142) that the genitive assigned by *bać się* 'fear' is lexical, and that assigned by *nienawidzić* 'hate' is structural.

Summary The Genitive of Negation test lets us classify all ad-verbal dative and instrumental as lexical, the genitive of negation as structural and almost all accusative complements as bearing structural case. Moreover, we saw some evidence for the marginal rôle of the lexical accusative. On the other hand, we argued that the Genitive of Negation test does not tell us anything about the status of nominative subjects.

5.1.3 Nominalization

The comparison of case assignment to arguments of finite verbs and to arguments of corresponding deverbal nouns confirms the conclusions of the previous section.[11]

Accusative is Structural, Dative and Instrumental are Lexical As in the case of Genitive of Negation, Nominalization triggers the accusative to genitive case shift of direct objects (see (5.30)–(5.31)), and it preserves the case of dative (cf. (5.32)–(5.33)) and instrumental (cf. (5.34)–(5.36)) complements:[12]

(5.30) a. Janek lubi Marię.
John$_{nom}$ likes Mary$_{acc}$
'John likes Mary.'

b. lubienie Marii (przez Janka)
like$_{grnd}$ Mary$_{gen}$ by John
'John's liking Mary'

(5.31) a. Janek uderzył Marię.
John$_{nom}$ hit Mary$_{acc}$
'John hit Mary.'

b. uderzenie Marii (przez Janka)
hit$_{grnd}$ Mary$_{gen}$ by John
'John's hitting Mary'

(5.32) a. Janek pomaga Tomkowi.
John$_{nom}$ helps Tom$_{dat}$
'John is helping Tom.'

b. pomaganie Tomkowi (przez Janka)
help$_{grnd}$ Tom$_{dat}$ by John
'John's helping Mary'

(5.33) a. Janek pogratulował Tomkowi.
John$_{nom}$ congratulated Tom$_{dat}$
'John congratulated Tom.'

b. pogratulowanie Tomkowi (przez Janka)
congratulate$_{grnd}$ Tom$_{dat}$ by John

[11] We consider here only the fairly productive *-nie*/*-cie* nominals, called *substantiva verbalia* by Puzynina (1969), *gerundives* by Tajsner (1990) and *verbal nouns* by Rozwadowska (1997). See these works for extensive characterization of *-nie*/*-cie* nominals, and for discussion of their mixed nominal/verbal properties.

[12] See also Tajsner (1990) for similar data and similar conclusions within the GB framework.

'John's congratulating Tom'

(5.34) a. Janek kieruje fabryką.
John$_{nom}$ manages factory$_{ins}$
'John runs (a/the) factory.'

b. kierowanie fabryką (przez Janka)
manage$_{grnd}$ factory$_{ins}$ by John
'John's managing (a/the) factory'

(5.35) a. Młodzież fascynuje się kulturą starożytną.
youth fascinate RM culture$_{ins}$ ancient$_{ins}$
'Young people are fascinated with ancient culture.'

b. fascynowanie się młodzieży kulturą starożytną
fascinate$_{grnd}$ RM youth$_{gen}$ culture$_{ins}$ ancient$_{ins}$
'young people's fascination with ancient culture'[13]

(5.36) a. Maria bawi się lalką.
Mary plays RM doll$_{ins}$
'Mary plays with a doll.'

b. bawienie się lalką
play$_{grnd}$ RM doll$_{ins}$
'playing with a doll'

Moreover, by the same reasoning as in the case of the Genitive of Negation, we should classify the ad-nominal genitive case in (5.30b)–(5.31b) as structural (because it alternates with ad-verbal accusative).

Nominative is Structural According to the Nominalization test, also the nominative case on the subject is unstable and, thus, should be classified as structural:

(5.37) a. Janek pływa.
John$_{nom}$ swims
'John is swimming.'

b. pływanie Janka
swim$_{grnd}$ John$_{gen}$

(5.35) a. Młodzież fascynuje się kulturą starożytną.
youth$_{nom}$ fascinate RM culture$_{ins}$ ancient$_{ins}$

[13]This example comes from Rozwadowska (1997, p.91), where it is classified as an object experiencer nominal, on the assumption that it is derived from (i) below.

(i) Kultura starożytna fascynuje młodzież.
culture$_{nom}$ ancient$_{nom}$ fascinates youth$_{acc}$
'Ancient culture fascinates young people.'

This assumption is most probably wrong: the presence of the reflexive marker *się* and the instrumental case show that (5.35b) is related to (5.35a), and not to (i) This means that (5.35b) should be classified as a subject experiencer nominal.

'Young people are fascinated with ancient culture.'

b. fascynowanie się młodzieży kulturą starożytną
fascinate$_{grnd}$ RM youth$_{gen}$ culture$_{ins}$ ancient$_{ins}$
'young people's fascination with ancient culture'

(5.38) a. Marysia pocałowała Janka.
Mary$_{nom}$ kissed John$_{acc}$
'Mary kissed John.'

b. pocałowanie Janka przez Marysię
kiss$_{grnd}$ John$_{gen}$ by Mary$_{acc}$
'Mary's kissing John'

The facts are somewhat complicated here for two reasons: First, the subject of the verbal noun may be realized either as what looks like a genitive NP (cf. (5.37) and (5.35) above) or as a PP[*przez*] (Polish equivalent of English PP[*by*]; cf. (5.38), or (5.32) and (5.34) above), roughly depending on the transitivity of the predicate (Rozwadowska, 1997). Second, when the subject of such a verbal noun is realized by a pronoun, it must be a possessive pronoun agreeing with the noun in case, and not a genitive (personal or reflexive) pronoun; compare the examples below with (5.37) above.[14]

(5.39) a. moje pływanie
my$_{poss}$ swim$_{grnd}$
'my swimming'

b. *pływanie mnie
swim$_{grnd}$ me$_{gen}$

We do not have anything to say here about the realization of the subject of *-nie*/*-cie* nominals, see Rozwadowska (1997) for discussion. Nevertheless, since it never retains the nominative case of the subject of a verb, we conclude that this nominative is structural.

Lexical Accusative? It seems that Nominalization could bear on the issue of lexical accusative of complements in examples (5.20)–(5.22), repeated below: if these complements may retain their accusative case as arguments of respective verbal nouns, then this is the lexical accusative, otherwise it is probably the structural accusative.

(5.20) a. Głowa ją boli.
head$_{nom}$ she$_{acc}$ aches
'Her head is aching.'

b. Głowa już ją / jej nie boli.
head$_{nom}$ already she$_{acc/gen}$ NM aches
'Her head isn't aching any more.'

[14]The difference between a personal or reflexive pronoun and the corresponding possessive pronoun is clear in cases of 1st person, 2nd person, and reflexive pronouns, but much less clear in case of 3rd person pronouns. For example, the masculine singular form *jego* can serve both as a genitive personal pronoun, and as a possessive pronoun. However, the difference between the two becomes visible in case of the short form *go*, which can only act as a personal pronoun, not as a possessive pronoun. This observation is due to Cetnarowska (1998).

(5.21) a. Stać ją było na kupno samochodu.
afford she$_{acc}$ Aux on buying car
'She could afford buying a car.'

b. Nie stać ją / jej było na kupno samochodu.
NM afford she$_{acc/gen}$ Aux on buying car
'She couldn't afford buying a car.'

(5.22) a. To ją kosztowało majątek.
this$_{nom}$ she$_{acc}$ cost fortune$_{acc}$
'This cost her a fortune.'

b. To ją / jej nie kosztowało ani grosza.
this$_{nom}$ she$_{acc/gen}$ NM cost even penny$_{gen}$
'This didn't cost her as much as a penny.'

Unfortunately, this test cannot be applied because verbal *-nie*/*-cie* nouns corresponding to the verbs above simply do not exist:[15]

(5.40) *bolenie ją / jej głowy
ache$_{grnd}$ she$_{acc/gen}$ head$_{gen}$

(5.41) *stanie ją / jej na...
afford$_{grnd}$ she$_{acc/gen}$ on

(5.42) *kosztowanie ją... / jej...
cost$_{grnd}$ she$_{acc/gen}$

Thus, we are left with the weak evidence for the lexical accusative provided by the Genitive of Negation facts (5.20)–(5.22).[16]

Genitive Arguments Note also, that just as in case of the Genitive of Negation (see examples (5.28)–(5.29) above), Nominalization does not tell us anything about the genitive arguments:

(5.43) a. Janek boi się burzy.
John$_{nom}$ fears RM tempest$_{gen}$
'John is afraid of the tempest.'

b. banie się burzy
fear$_{grnd}$ RM tempest$_{gen}$
'the fear of tempest'

[15]It is clear why *stać* cannot be nominalized: contrary to appearances, it is not a verb (as used in (5.21) above) at all. In case of *boleć* and *kosztować*, the reason has probably to do with the lack of agentivity / volitionality in the lexical semantics of such verbs.

[16]On the other hand, such marginal presence of the lexical accusative in Polish should not be surprising; similarly very restricted lexical accusative is also present in German and Icelandic, see Haider (1985) and Yip *et al.* (1987), respectively.

(5.44) a. Janek nienawidzi klasówek.
John$_{nom}$ hates class-tests$_{gen}$
'John hates class-tests.'

b. nienawidzenie klasówek
hate$_{grnd}$ class-tests$_{gen}$
'hating class-tests'

Again, the genitive case on the arguments of verbal nouns may be interpreted as lexical (i.e., the lexical genitive case does not change), or as structural (the case 'changes' to genitive, just as structural accusative).

Summary The Nominalization test confirmed the results of the previous section, i.e., that dative and instrumental arguments are lexical, and that (most) accusative arguments are structural, and also established that nominative case on the subject is structural as well. On the other hand, it neither confirms nor disconfirms the lexicality of accusative arguments of *boleć* 'ache', *stać na* 'afford' and *kosztować* 'cost', nor does it bear on the issue of structural/lexical case of genitive complements.

In the next subsection, we discuss other—rarely noticed—arguments for the structural/lexical dichotomy in Polish.

5.1.4 Non-Inherent Phrases

In Polish, there seem to be some lexical units which can bear only structural case: *dużo*-type indefinite numerals, *nic* 'nothing' and distributive *po*-phrases. We will deal with these phrases in turn.[17]

5.1.4.1 *Dużo*-type Phrases

There is a class of indefinite numerals, including *dużo* 'a lot', *mało* 'little / few', *trochę* 'a little / a few', *sporo* 'quite a lot', which do not visibly decline for case, and which display very restrictive paradigm: they cannot occur in dative, instrumental or locative positions:

(5.45) *Janek pomaga dużo osób / osobom. (dative position)
John helps many people$_{gen}$ / people$_{dat}$

(5.46) *Janek kieruje dużo fabryk / fabrykami. (instrumental)
John manages many factories$_{gen}$ / factories$_{ins}$

(5.47) *Janek rozmawia o dużo osób / osobach. (locative)
John talks about many people$_{gen}$ / people$_{loc}$

[17] To the best of our knowledge, the relevant property of *dużo*-phrases was first noticed in Przepiórkowski (1996a) (which earlier appeared as a chapter of Czuba and Przepiórkowski (1995), and later was abridged as Przepiórkowski (1997b)), although similar facts have also been known for Russian, e.g., Babby (1986), and the structurality of *nic* was first pointed out in Przepiórkowski and Kupść (1997a). Distributive *po*-phrases in Polish are extensively discussed in Łojasiewicz (1980) and Franks (1995, pp.160ff.).

In order to express the intended meanings, the indefinite numeral *wielu*, which displays the full paradigm, may be used:

(5.48) Janek pomaga wielu osobom.
John helps many$_{dat}$ people$_{dat}$
'John helps many people.'

(5.49) Janek kieruje wieloma fabrykami.
John manages many$_{ins}$ factories$_{ins}$
'John runs many factories.'

(5.50) Janek rozmawia o wielu osobach.
John talks about many$_{loc}$ people$_{loc}$
'John is talking about many people.'

Traditionally (see, e.g., Doroszewski (1980)) these defective *dużo*-type indefinite numerals are analysed as having only nominative and accusative forms, while Saloni and Świdziński (1985, p.83)[18] add that they can also occur in ad-verbal genitive positions.[19]

(5.51) Dużo ludzi przyszło. (nominative position)
many people came
'Many people came.'

(5.52) Widziałem dużo gwiazd filmowych. (accusative position)
saw$_{1st,sg,masc}$ many stars film
'I saw many film stars.'

(5.53) Nie widziałem dużo gwiazd filmowych. (genitive position)
NM saw$_{1st,sg,masc}$ many stars film
'I didn't see many film stars.'

(5.54) zobaczenie wielu / *dużo gwiazd (genitive position)
seeing many / many stars

As the examples above show, *dużo*-phrases are possible in nominative, accusative and ad-verbal genitive positions, but not in ad-nominal genitive positions, where *wiele* 'many' can be used instead.

In fact, this generalization is imprecise: *dużo*-type indefinite numerals may appear only in some ad-verbal genitive positions, but not in others. All verbs in the examples below subcategorize for genitive complements, and they all sound infelicitous with *dużo*.

(5.55) Boję się wielu / *dużo osób.
fear$_{1st,sg}$ RM many / many people
'I am afraid of many people.'

[18] See also Saloni and Świdziński (1998, p.91).

[19] We will not deal here either with the internal structure of such phrases or with the agreement patterns they enter; see §5.3, especially §5.3.2.4.

(5.56) Chwytałem się wielu / *dużo sposobów.
catch RM many / many means
'I tried many means.'

(5.57) Janek dochodził wielu / *dużo swoich praw.
John vindicated many / many Self$_{poss}$ rights
'John vindicated his own rights.'

(5.58) Domyślałem sie wielu / *dużo jego wad.
guessed$_{1st,sg,masc}$ RM many / many his vices
'I suspected many of his vices.'

(5.59) Udzieliłem mu wielu / ?*dużo porad.
gave him many / many advices
'I gave him many advices.'

On the other hand, *dużo*-phrases are clearly allowed in genitive of negation positions, as illustrated by (5.53) above and by the examples below:

(5.60) Janek wcale nie kupił dużo ubrań.
John at all NM bought many clothes
'John didn't buy too many clothes.'

(5.61) Jego postawa nie zaskoczyła (zbyt) dużo osób.
his behaviour NM surprised too many people
'His behaviour didn't surprise (too) many people.'

Thus, in summary, *dużo*-type phrases occur in the following ad-verbal case positions:

- nominative,
- accusative,
- genitive of negation,

but they cannot occur in the following ad-verbal positions:

- idiosyncratically assigned genitive,
- dative,
- instrumental.

Note that this split is strikingly consistent with the results of the Genitive of Negation and Nominalization tests, which made us classify nominative, accusative and genitive of negation as structural cases, and dative and instrumental as lexical cases, but which did not tell us anything about genitive complements of non-negated verbs, or about locative positions.[20] Thus, we are justified in interpreting the data in (5.45)–(5.47), (5.51)–(5.53) and (5.55)–(5.61) as evidence for the inherent structurality of *dużo*-type phrases. That is, *dużo*-type phrases can bear only structural, never lexical, case.

One problem with this position, however, is the ungrammaticality of (5.54), repeated below.

(5.54) zobaczenie wielu / *dużo gwiazd (genitive position)
seeing many / many stars

If *dużo*-phrases are structural, and the ad-nominal genitive alternating with ad-verbal accusative is structural, then why is (5.54) unacceptable?

There are two possible answers to this question: either ad-nominal genitive is, after all, lexical; or there are additional restrictions imposed on the distribution of *dużo*-phrases. In Przepiórkowski (1996a), we explored the former possibility, but here we will adopt the latter stance, as it leads to a more modular case principle and to simpler lexical ('redundancy') rules relating verbs to verbal nouns.[21] Thus, we assume that *dużo*-type phrases may bear only structural case and, additionally and somewhat idiosyncratically, cannot occur in ad-nominal positions. We see no explanation for this additional idiosyncrasy.

Before we conclude this subsection, a brief note on apparently lexical accusative complements (see (5.20)–(5.22) on p.110 above) is in order: *dużo*-type phrases do not help us to decide on the issue of structural/lexical status of these complements. The problem is that, in all of (5.20a)–(5.22a), the lexical accusative argument seems to alternate with the structural accusative, as suggested by the optionality of genitive of negation in (5.20b)–(5.22b). So, *dużo*-phrases appearing in these accusative positions, as shown below, can be interpreted as actually appearing only in the optional structural position.

(5.62) ?Głowa boli dużo osób.
head$_{nom}$ aches many people
'Many people have headache.'

(5.63) Dużo osób stać na kupno samochodu.
many people afford on buying car
'Many people can afford buying a car.'

(5.64) Dużo osób kosztowało to fortunę.
many people cost this fortune
'This cost many people a fortune.'

[20]Recall that locative is reserved to complements of some prepositions, e.g., *o* 'about', *po* 'after', *na* 'on', so it is necessarily immune to Genitive of Negation and Nominalization, which affect only verbal (and nominal, in case of Nominalization) dependents.

[21]In brief, assuming the lexicality of ad-nominal genitive complements and the structurality of the corresponding ad-verbal arguments, lexical rules (such as those alluded to in Przepiórkowski (1996a)) have to map structural objects of verbs to lexical genitive complements of verbal nouns. This means that 1) they actually take over part of the duty of case theory, 2) they cannot identify whole synsems of ad-verbal arguments with synsems of corresponding ad-nominal arguments. The latter property makes it necessary to split the lexical rule into a number of cases (one for NP arguments, another for PP arguments, etc.).

Thus, *dużo*-type phrases do not provide any arguments for or against the lexicality of the accusative case in (5.20)–(5.22). The same applies to the next two kinds of phrases, namely, *nic* 'nothing' and distributive *po*-phrases.

In summary, *dużo*-type phrases seem to provide a partial test for the structurality of a given syntactic position: if a *dużo*-type phrase can appear in this position, then it should be classified as structural. According to this test, nominative, (most) accusative, and genitive of negation positions are structural. See §5.3.2.4 for an analysis of *dużo*-type indefinite numerals.

5.1.4.2 *Nic*

As discussed in Przepiórkowski and Kupść (1997a, pp.15–16), the distribution of *nic* 'nothing' strongly resembles that of *dużo*-type phrases: *nic* cannot appear in that form in dative, instrumental or lexical genitive positions, cf. (5.65)–(5.67), but it may appear as a genitive of negation complement of a negated verb and as a nominative subject, cf. (5.68)–(5.69).[22]

(5.65) Nie przyglądam się niczemu / *nic. (dative position)
NM observe$_{1st,sg,masc}$ RM nothing$_{dat}$ / nothing
'I am not looking at anything.'

(5.66) Nie kieruję niczym / *nic. (instrumental)
NM manage$_{1st,sg,masc}$ nothing$_{ins}$ / nothing
'I am not running anything.'

(5.67) Nie boję się niczego / *nic. (lexical genitive)
NM fear$_{1st,sg,masc}$ RM nothing$_{gen}$ / nothing
'I am not afraid of anything.'

(5.68) Nie widziałem niczego / nic. (genitive of negation)
NM saw$_{1st,sg,masc}$ nothing$_{gen}$ / nothing
'I haven't seen anything.'

(5.69) Nic nie spadło. (nominative)
nothing NM fell
'Nothing fell down.'

Moreover, *nic* behaves just like *dużo*-type phrases in being disallowed in ad-nominal genitive positions:

(5.70) niezobaczenie niczego / *nic
NM see$_{grnd}$ nothing$_{gen}$ / nothing
'seeing nothing'

Thus, *nic* joins *dużo*-phrases in providing a partial test for structurality of a given syntactic position.

[22] *Nic* cannot appear in ad-verbal accusative positions for independent reasons: as an *n*-word, it may appear only in negative environments, which—in turn—trigger genitive of negation. See Przepiórkowski and Kupść (1997a,c,b, 1999) for an exhaustive description and analysis of Negative Concord in Polish.

5.1.4.3 Distributive *po*-Phrases

The first approximation of the generalization concerning the distribution of *po*-phrases can be found in Franks (1995, pp.160ff.): "they freely appear in subject and object positions." More specifically, they can appear in nominative subject and accusative complement positions, but not in dative, instrumental or lexical genitive positions:[23,24]

(5.71) Po dwóch studentów czytało te książki. (nominative position)
Dist two students read these books
'These books were read by two students each.'

(5.72) Każdy student miał po dolarze. (accusative)
every student had Dist dollar
'Each student had one dollar.'

(5.73) *Każdy z nich pomógl po trzem/trzy osobom/osoby. (dative)
each of them helped Dist three$_{dat/acc}$ persons$_{dat/acc}$
'Each of them helped three people.' (intended)

(5.74) *Każdy z nich kierował po trzema/trzy fabrykami/fabryki. (instrumental)
each of them managed Dist three$_{ins/acc}$ factories$_{ins/acc}$
'Each of them ran three factories.' (intended)

(5.75) *Każdy z nich bał się po trzech/trzy osób/osoby. (lexical genitive)
each of them feared RM Dist three$_{gen/acc}$ persons$_{gen/acc}$
'Each of them was afraid of three people.' (intended)

(5.76) *Każda z tych spraw dotyczyła po trzech/trzy osób/osoby. (lexical genitive)
each of this matters concerned Dist three$_{gen/acc}$ persons$_{gen/acc}$
'Each of these matters concerned three people.' (intended)

On the other hand, *po*-phrases can occupy the genitive of negation positions. Although sometimes the result is slightly marginal, the examples below are clearly much more acceptable than (5.73)–(5.76).

(5.77) Ci studenci nie mieli po dolarze. (genitive of negation)
these students NM had Dist dollar
'These students didn't have one dollar each.'

(5.78) ?Każdy z nich nie przeczytał po trzy z zadanych książek. (genitive of
each of them NM read Dist three of assigned books
negation)
'Each of them didn't read three of the assigned books.'

[23] Examples (5.71) and (5.72) are from Franks (1995, pp.161f.).

[24] We will not deal with internal structure of *po*-phrases here.

(5.79) Nie dałem im po trzy książki, ale po pięć. (genitive of negation)
NM gave$_{1st,sg,masc}$ them$_{dat}$ Dist three books but Dist five
'I didn't give them three books each, but five.'[25]

Interestingly, unlike indefinite *dużo*-type phrases and *nic*, *po*-type distributive phrases may marginally appear as ad-nominal complements corresponding to accusative ad-verbal complements:

(5.80) a. Podarowałem każdemu z nich trzy książki.
donate$_{1st,sg,masc}$each$_{dat}$ of them three$_{acc}$ books
'I gave each of them three books.'

b. ?podarowanie każdemu z nich po trzy książki
give$_{grnd}$ each$_{dat}$ of them Dist three books
'giving each of them three books'

(5.81) a. Każdy z nich kupił trzy marynarki.
each of them bought three$_{acc}$ jackets
'Each of them bought three jackets.'

b. kupienie przez każdego z nich po trzy marynarki
buy$_{grnd}$ by each of them Dist three jackets
'each of them buying three jackets'

On the other hand, *po*-phrases cannot appear in ad-nominal dative, instrumental and lexical genitive positions:

(5.82) *pomaganie przez każdego z nich po trzem/trzy osobom/osoby (dative)
help$_{grnd}$ by each of them Dist three$_{dat/acc}$ persons$_{dat/acc}$
'their help for three people (each)' (intended)

(5.83) *kierowanie przez każdego z nich po trzema/trzy fabrykami/fabryki. (instrumental)
managing by each of them Dist three$_{ins/acc}$ factories$_{ins/acc}$
'each of them managing three factories' (intended)

(5.84) *ich banie się po trzech/trzy osób/osoby. (lexical genitive)
their fear$_{grnd}$ RM Dist three$_{gen/acc}$ persons$_{gen/acc}$
'each of them being afraid of three people' (intended)

In summary, distributive *po*-phrases may appear in the following positions:

[25] Despite the contrastive reading, the relevant position is still genitive:

(i) Nie dałem mu kasety / *kasetę, tylko CD.
NM gave$_{1st,sg,masc}$ him$_{dat}$ cassette$_{gen}$ / cassette$_{acc}$ but CD
'I didn't give him a cassette, only a CD.'

- nominative,
- accusative,
- genitive of negation,
- genitive of nominalization (sometimes only marginally),

while being forbidden from the following positions:

- lexical genitive (both ad-verbal and ad-nominal),
- dative (both ad-verbal and ad-nominal),
- instrumental (both ad-verbal and ad-nominal).

This distribution strongly suggests that *po*-phrases can occur exactly in structural positions (subject to further, semantic, restrictions) and it independently supports our decision to treat the genitive of nominalization as a structural case.[26]

5.1.5 Predication by NP[*ins*]s

Another argument for the structural vs. inherent case dichotomy, to the best of our knowledge not noticed in the literature so far, is the possibility of predication by instrumental NPs, as in (5.85)–(5.94).

(5.85) Janek wyjechał bogaczem, a wrócił żebrakiem.
John$_{nom}$ left rich man$_{ins}$ and returned pauper$_{ins}$
'John left (as) a rich man and came back (as) a pauper.'

(5.86) Janek jest / wydaje się mądrym człowiekiem.
John$_{nom}$ is / seems Aux wise$_{ins}$ man$_{ins}$
'John is / seems (to be) a wise man.'

(5.87) Ojciec umarł / obudził się żebrakiem. (Pisarkowa, 1965, p.12)
father$_{nom}$ died / woke RM pauper$_{ins}$
'The father died / woke up as a pauper.'

[26]The matters are more complicated with respect to ad-nominal possessive phrases corresponding to ad-verbal nominative; the grammatical status of *po*-phrases in such positions is not clear:

(i) a. Z każdego drzewa spadło po pięć jabłek.
from each tree fell Dist five apples
'Five apples fell from each tree.'

b. ??spadnięcie po pięć jabłek z każdego drzewa
fall$_{grnd}$ Dist five apples from each tree
'falling of five apples from each tree'

In this study, we will ignore the difficult problem of the realization of ad-nominal subjects, but see Rozwadowska (1997) for some discussion.

(5.88) Pamiętam go głupcem.
remember$_{1st,sg}$ him$_{acc}$ fool$_{ins}$
'I remember him (as) a fool.'

(5.89) Widzę / rodzę / budzę / wybieram go królem. (Pisarkowa, 1965, p.21)
see$_{1st,sg}$ / deliver$_{1st,sg}$ / wake$_{1st,sg}$ / elect$_{1st,sg}$ him$_{acc}$ king$_{ins}$
'I see / deliver / wake / elect him a king.'

(5.90) Taki przypadek nazywamy przypadkiem strukturalnym.
such case$_{nom}$ call$_{1st,pl}$ case$_{ins}$ structural$_{ins}$
'We call such a case 'structural case'.'

(5.91) Lubiłem go szefem "Solidarności"...
liked$_{1st,sg,masc}$ him$_{acc}$ boss$_{ins}$ "Solidarity"$_{gen}$...
'I liked him (as) the boss of "Solidarity"...'

(5.92) ...a nie lubiłem go prezydentem.
and NM liked$_{1st,sg,masc}$ him$_{gen}$ president$_{ins}$
'...but didn't like (him) as the president.'

(5.93) Nie widziałem jej nigdy taką piękną kobietą.
NM saw$_{1st,sg,masc}$ her$_{gen}$ never such$_{ins}$ beautiful$_{ins}$ woman$_{ins}$
'I've never seen her as such a beautiful woman.'

(5.94) Nie nazywamy takiego przypadka przypadkiem leksykalnym.
NM call$_{1st,pl}$ such$_{gen}$ case$_{gen}$ case$_{ins}$ lexical$_{ins}$
'We don't call such a case 'lexical case'.'

In (5.85)–(5.87), the predicated NP is in the nominative case, in (5.88)–(5.91) it is accusative, and in (5.92)–(5.94) it is genitive of negation. Moreover, in some cases ((5.86), (5.90), (5.94)) the predicative NP[*ins*] is clearly subcategorized for by the verb (in (5.86) as a primary predicate), while in others it apparently is not. In all these cases predication by an NP[*ins*] is possible, so we may conclude that predicative NP[*ins*] may predicate of structural NPs.

This is not to say that all structural NPs may be predicated of by NP[*ins*], e.g.:

(5.95) Janek pocałował / uderzył Marię ?*królem / ?*królową.
John$_{nom}$ kissed / hit Mary$_{acc}$ king$_{ins}$ / queen$_{ins}$
'John kissed / hit Mary (as) the king / the queen.'

A constraint on the occurrence of predicative NP[*ins*]s seems to be that they are blocked by instrumental adverbials of manner, when the latter are possible. We will have nothing to say about such additional constraints here.

On the other hand, lexical NPs cannot be predicated of by instrumental NPs, even in cases when instrumental adverbials of manner are not felicitous:

(5.96) ?*Boję się go prezydentem.
fear$_{1st,sg}$ RM him$_{gen}$ president$_{ins}$
'I am afraid of him as the president.'

(5.97) *Marii było dobrze królową.
Mary$_{dat}$ was well queen$_{ins}$
'Mary felt well being the queen.' (intended)

(5.98) *Brakowało mu ogłady królem.
lacked him$_{dat}$ lustre king$_{ins}$
'He lacked the lustre as a king.' (intended)

(5.99) *Chwaliłem się nim moim bratem.
boasted$_{1st,sg,masc}$ RM him$_{ins}$ my$_{ins}$ brother$_{ins}$
'I boasted of him (as of) my brother.' (intended)

The relevant meaning can be instead conveyed using the other, and more robust, option available to (secondary) predication, i.e., case agreement (plus the marker *jako* 'as'):

(5.100) Boję się go jako prezydenta.
fear$_{1st,sg}$ RM him$_{gen}$ as president$_{gen}$
'I am afraid of him as the president.'

(5.101) Marii było dobrze jako królowej.
Mary$_{dat}$ was well as queen$_{dat}$
'Mary felt well being the queen.'

(5.102) Brakowało mu ogłady jako królowi.
lacked him$_{dat}$ lustre as king$_{dat}$
'He lacked the lustre as a king.'

(5.103) Chwaliłem się nim jako moim bratem.
boasted$_{1st,sg,masc}$ RM him$_{ins}$ as my$_{ins}$ brother$_{ins}$
'I boasted of him as of my brother.'

As in the case of other tests (with the exception of *dużo*-phrases and *nic*), predication by NP[*ins*] also confirms that the genitive of nominalization is structural and other ad-nominal cases are lexical:

(5.104) ?wyjechanie Janka żebrakiem
leave$_{grnd}$ John$_{gen}$ pauper$_{ins}$
'John's leaving as a pauper'

(5.105) pamiętanie go głupcem
remember$_{grnd}$ him$_{gen}$ fool
'remembering his as a fool'

(5.106) *banie się go prezydentem
fear$_{grnd}$ RM him$_{gen}$ president
'being afraid of him as the president' (intended)

(5.107) *oświadczenie się mu królem
propose$_{grnd}$ RM him$_{dat}$ king$_{ins}$
'proposing to him as a king' (intended)

(5.108) *chwalenie się nim swoim bratem
boast$_{grnd}$ RM him$_{ins}$ Self$_{poss,ins}$ brother$_{ins}$
'boasting of him as of one's brother' (intended)

Again, the relevant meaning may be expressed with *jako* + NP agreeing in case with the predicated phrase.

In summary, predicative instrumental NPs may predicate of the following NP arguments of verbs and (de)verbal nouns (subject to further constraints):

- nominative,
- accusative,
- genitive of negation,
- genitive of nominalization,

and they cannot modify NPs in the following positions:

- lexical genitive (ad-verbal and ad-nominal),
- dative (ad-verbal and ad-nominal),
- instrumental (ad-verbal and ad-nominal).

We will have more to say about predication and case assignment in §5.4 below.

5.1.6 Intermediate Summary

In this section, we have so far identified four criteria for distinguishing structural and lexical (inherent) case positions: Genitive of Negation, Nominalization, certain phrases which, apparently, may occupy only structural positions, and predicative modifiability by an NP[*ins*]. The first two criteria are well-known, while the other two are relatively novel. Table 5.1 summarizes the partial results of this section.

Here is how this Table should be read. In case of Genitive of Negation and Nominalization columns, a '+' means that arguments of the kind specified by the row visibly undergo the case shift, '−' means that they visibly do not undergo such a change, and NA ('does not apply')

	GoN	Nominalization	*dużo*, *nic*	*po*	NP[*ins*]
ad-verbal arguments:					
nominative	−	+	+	+	+
accusative (standard case)	+	+	+	+	+
genitive of negation	+	NA	+	+	+
other genitive	NA	NA	−	−	−
dative	−	−	−	−	−
instrumental	−	−	−	−	−
accusative of *boleć*, etc.	+/−	NA	NA	NA	NA
ad-nominal arguments:					
genitive of nominalization	NA	+	−	+	+
other genitive	NA	NA	−	−	−
dative	−	−	−	−	−
instrumental	−	−	−	−	−

Table 5.1: Tests for Structural vs. Inherent Case in Polish: Partial Results

means that the result may be interpreted either way.[27] In case of the next two columns, '+' means that a phrase of the given kind may appear in given positions, and '−' means that it cannot. Finally, in case of the NP[*ins*] column, '+' means that a phrase of a given kind can (in principle) be modified by a predicative NP[*ins*], while '−' means that it cannot.

Now, assuming that structural positions are given by these rows which allow at least one '+', ad-verbal accusative and genitive of negation positions are prototypical structural positions, and the nominative and genitive of nominalization are also clear cases of structural positions, assuming that the impossibility of Genitive of Negation in the former and the infelicity of *dużo*-phrases and *nic* in the latter are results of independent constraints. On the other hand, dative and instrumental positions, both ad-verbal and ad-nominal, are prototypical cases of lexical positions, and idiosyncratically assigned genitive positions are slightly less-clear cases of such lexical positions. Finally, accusative arguments of verbs such as *boleć*, *stać* and *kosztować* should probably be classified as optionally lexical, although evidence for this position is particularly sparse.

In the remainder of this section, we will investigate the status of some other case positions.

5.1.7 Arguments of Prepositions

Can prepositions take structural arguments? Arguments of prepositions do not change their case under negation or in the process of nominalization, but this may be because only *direct* ad-verbal arguments are affected by these processes, not arguments separated by an additional PP layer. Also secondary predicates (both instrumental and case-agreeing) seem to be able to modify only direct arguments of primary predicates (verbs or nouns). On the other hand,

[27] '−/+' in the accusative of *boleć*, etc. / GoN cell means that the accusative argument undergoes Genitive of Negation only optionally.

it seems that the test provided by *dużo*-phrases and by *nic* is more appropriate.[28]

According to this test, prepositions subcategorizing for an accusative complement actually subcategorize for a structural complement; such an accusative complement may be realised by a *dużo*-phrase or by *nic*.

(5.109) *za* + accusative:

a. Musiałem zapłacić za (zbyt) dużo zbrodni.
must$_{1st,sg,masc}$ pay for too many crimes
'I had to pay for too many crimes.'

b. Za nic nie musiałem płacić.
for nothing NM must$_{1st,sg,masc}$ pay
'I didn't have to pay for anything.'

(5.110) *na* + accusative:

a. Czekamy jeszcze na dużo osób.
wait$_{1st,pl}$ still for many people
'We are still waiting for many people.'

b. Na nic nie czekamy.
for nothing NM wait$_{1st,pl}$
'We aren't waiting for anything.'

(5.111) *przez* + accusative:

a. ?Ten film został obejrzany przez dużo osób.
this film Aux see$_{passp}$ by many people
'This film was seen by many people.'

b. Przez nic nie przejeżdżałem.
through nothing NM went$_{1st,sg,masc}$
'I didn't drive through anything.'

(5.112) *o* + accusative:

a. Pytałem o dużo różnych spraw.
asked$_{1st,sg,masc}$ about many different matters
'I asked about many different matters.'

b. Nie pytałem o nic.
NM asked$_{1st,sg,masc}$ about nothing
'I didn't ask about anything.'

On the other hand, prepositions taking genitive, dative, instrumental or locative arguments cannot occur with either *dużo* or *nic*.

[28]Note that the distributive *po*-test is unavailable here because, in Polish, prepositions take prepositional complements only in very special circumstances; Jaworska (1986a,b) mentions only locative and temporal uses, where the embedded PP specifies a point in space or time.

(5.113) *do* + genitive:

a. Przemawiała do wielu osób / *dużo osób.
talked$_{1st,sg,fem}$ to many$_{gen}$ people$_{gen}$ / many people
'She was addressing many people.'

b. To się nie nadaje do niczego / *nic.
this RM NM fit for nothing$_{gen}$ / nothing
'This isn't fit for anything.'

(5.114) *dla* + genitive:

a. Było to przykre dla wielu osób / *dużo osób.
was this sad for many$_{gen}$ people$_{gen}$ / many people
'It was sad/embarrassing for many people.'

b. Dla niczego / *nic nie warto się tak poniżać.
for nothing$_{gen}$ / nothing NM worth RM so humiliate
'Nothing is worth humiliating oneself so much.'

(5.115) *ku* + dative:

a. Skierowałem się ku wielu osobom / *dużo osób.
directed$_{1st,sg,masc}$ RM towards many$_{dat}$ people$_{dat}$ / many people
'I directed my steps towards many people.'

b. Nie skierowałem się ku niczemu / *nic.
NM directed$_{1st,sg,masc}$ RM towards nothing$_{dat}$ / nothing
'I didn't direct my steps towards anything.'

(5.116) *przeciw* + dative:

a. Byłem przeciw wielu ustawom / *dużo ustaw.
was$_{1st,sg,masc}$ against many$_{dat}$ laws$_{dat}$ / many laws
'I was against many bills of law.'

b. Nie byłem przeciw niczemu / *nic.
NM was$_{1st,sg,masc}$ against nothing$_{dat}$ / nothing
'I wasn't against anything.'

(5.117) *nad* + instrumental:

a. Nad wieloma wsiami / *dużo wsi unosił się dym.
over many$_{ins}$ villages$_{ins}$ / many villages hovered RM smoke
'There was smoke lingering over many villages.'

b. Nad niczym / *nic się nie zastanawiałem.
over nothing$_{ins}$ / nothing RM NM ponder
'I didn't ponder over anything.'

(5.118) *z* + instrumental:

a. Rozmawiałem z wieloma osobami / *dużo osób.
talked$_{1st,sg,masc}$ with many$_{ins}$ people$_{ins}$ / many people

‘I talked to many people.’

b. Z niczym / *nic się nie liczyłem.
with nothing$_{ins}$ / nothing RM NM respect
‘I didn’t respect anything.’

(5.119) *o* + locative:

a. Rozmawialiśmy o wielu osobach / *dużo osób.
talked$_{1st,pl}$ about many$_{loc}$ people$_{loc}$ / many people
‘We talked about many people.’

b. Nie rozmawialiśmy o niczym / *nic.
NM talked$_{1st,pl}$ about nothing$_{loc}$ / nothing
‘We didn’t talk about anything.’

(5.120) *przy* + locative:

a. Przy wielu osobach / *dużo osób jestem nieśmiała.
by many$_{loc}$ people$_{loc}$ / many people be$_{1st,sg}$ shy$_{1st,fem}$
‘I am shy in the company of many people.’

b. Przy niczym / *nic się nie napracowałem.
at nothing$_{loc}$ / nothing RM NM toiled
‘I didn’t toil at anything.’

In summary, the *dużo*/*nic*-test shows that the ad-prepositional accusative is structural, and suggests that ad-prepositional genitive, dative, instrumental and locative are lexical.[29]

5.1.8 Arguments of Adjectives and Adverbs

To the extent that active adjectival participles (Polish: *imiesłowy przymiotnikowe czynne*) are morphosyntactically adjectives (they inflect for case, gender and number, i.e., they have the properties defining the morphosyntactic class of adjectives in Polish, see Saloni and Świdziński (1998, pp.103, 190ff.)), adjectives can be said to be able to assign structural case.[30] As the examples below show, adjectival active participles behave in this respect just like verbs: they

[29]Matters are slightly complicated by the existence of apparent prepositions such as *jak* ‘how’ and *niż* ‘than’, extensively discussed in Szupryczyńska (1979) and Kallas (1986, 1995, 1996), allegedly subcategorizing for nominative NPs:

(i) Zobaczył chłopca wysokiego jak tyczka. (Kallas, 1986)
saw$_{3rd,sg,masc}$ boy$_{acc}$ high$_{acc}$ as pole$_{nom}$
‘He saw a boy as high as a pole.’

(ii) Zaanektowano krainę większą niż Wielka Brytania. (Kallas, 1995)
annex$_{-no/-to}$ land greater than Great Britain
‘A land greater than Great Britain was annexed.’

The status of *jak* and *niż* as prepositions is, however, controversial. For example, Bondaruk (1998) convincingly argues against ever treating *niż* as a proposition (and for treating it uniformly as a complementizer). Since investigating the status of *jak* and *niż* would lead us too far afield (into the relatively unexplored terrain of comparative constructions), we will ignore such alleged prepositions here.

[30]See Müller (1998b,a) for an analogous claim with respect to German.

may take accusative objects (5.121), which undergo Genitive of Negation (5.122), which can be realized as a *dużo*-phrase (5.123), *nic* (5.124) or a distributive *po*-phrase (5.125), and which can be modified by an NP[*ins*] predicate (5.126).

(5.121) Janek, lubiący Marię…
John like$_{adjp}$ Mary$_{acc}$
'John, who likes Mary…'

(5.122) Janek, nie lubiący Marii…
John NM like$_{adjp}$ Mary$_{gen}$
'John, who doesn't like Mary…'

(5.123) Janek, lubiący tak dużo osób…
John like$_{adjp}$ so many people
'John, who likes so many people…'

(5.124) Janek, nic nie robiący przez cały dzień…
John nothing NM do$_{adjp}$ through all day
'John, who doesn't do anything all day long…'

(5.125) Wałęsa, dający każdemu po 100000 złotych…
Wałęsa give$_{adjp}$ everybody$_{dat}$ Dist 100000 zloty
'Wałęsa, who gives everybody 100000 zloty…'

(5.126) Janek, pamiętający mnie dzieckiem…
John remember$_{adjp}$ me$_{acc}$ child$_{ins}$
'John, who remembers me as a child…'

The same, *mutatis mutandi*, holds for adverbial participles (Polish: *imiesłowy przysłówkowe*), both present and past (Polish: *współczesne* and *uprzednie*).

It can be said, though, that such adjectival and adverbial participles are mixed categories, and that it is their 'verbness' that decides about their case assignment properties. Are there, then, more prototypical (i.e., non-deverbal) adjectives or adverbs which can assign structural case?

Saloni and Świdziński (1998, p.193) give, after Szupryczyńska (1978), following examples of adjectives subcategorizing for an NP: *przeciwny* 'against' + dative, *pełny* 'full' + genitive, *pewny* 'sure' + genitive, *ciekawy* 'curious' + genitive. The following adjectives can be added to this list: *drogi* 'dear' + dative, *bliski* + dative, *winny* 'guilty' + genitive, *godny* 'deserving' + genitive, *świadomy* 'conscious' + genitive. Note that none among these adjectives takes an accusative complement. Moreover, none of them can take a *dużo*-phrase, *nic* or a distributive *po*-phrase as a complement, e.g.:

(5.127) a. przeciwny wielu osobom / *dużo osób
against many$_{dat}$ people$_{dat}$ / many people

'(being) against many people'

b. On nie jest przeciwny niczemu / *nic.
he$_{nom}$ NM is against nothing$_{dat}$ / nothing
'He isn't against anything.'

c. Każdy z nich jest przeciwny trzem przedsięwzięciom / *po trzy przedsięwzięcia.
each of them is against three projects / Dist three projects
'Each of them is against three projects.'

(5.128) a. winny wielu zbrodni / *dużo zbrodni
guilty many$_{gen}$ crimes$_{gen}$ / many crimes
'guilty of many crimes'

b. On nie jest winny niczego / *nic.
he NM is$_{1st,sg}$ guilty nothing$_{gen}$ / nothing
'He isn't guilty of anything.'

c. Każdy z nich jest winny trzech zbrodni / *po trzy zbrodnie.
each of them is guilty three crimes / Dist three crimes
'Each of them is guilty of three crimes.'

Such ad-adjectival arguments also cannot be predicated of by an NP[*ins*], see the contrast between examples a. and b. below.

(5.129) a. *Jestem przeciwny Wałęsie prezydentem.
be$_{1st,sg,masc}$ against Wałęsa$_{dat}$ president$_{ins}$
'I am against Wałęsa as the president.' (intended)

b. Jestem przeciwny Wałęsie jako prezydentowi.
be$_{1st,sg}$ against Wałęsa$_{dat}$ as president$_{dat}$
'I am against Wałęsa as the president.'

(5.130) a. *Jestem ciekawy Wałęsy prezydentem.
be$_{1st,sg}$ curious Wałęsa$_{gen}$ president$_{ins}$
'I am curious about Wałęsa as the president.' (intended)

b. Jestem ciekawy Wałęsy jako prezydenta.
be$_{1st,sg}$ curious Wałęsa$_{gen}$ as president$_{gen}$
'I am curious about Wałęsa as the president.'

Similar facts hold of adverbs, to the extent that, e.g., *blisko* 'close to' + genitive is an adverb at all:

(5.131) a. Mieszkam blisko wielu sklepów / *dużo sklepów.
live$_{1st,sg}$ close to many$_{gen}$ shops$_{gen}$ / many shops
'I live close to many shops.'

b. Nie mieszkam blisko niczego / *nic.
NM live$_{1st,sg}$ close to nothing$_{gen}$ / nothing

'I don't live close to anything.'

c. Każdy z nich mieszka blisko trzech sklepów / *po trzy sklepy.
each of them lives close to three shops / Dist three shops
'Each of them lives close to three shops.'

(5.132) a. *Mieszkałem blisko Wałęsy prezydentem.
lived$_{1st,sg,masc}$ close to Wałęsa$_{gen}$ president$_{ins}$
'I lived close to Wałęsa (when he was) the president.' (intended)

b. ??Mieszkałem blisko Wałęsy jako prezydenta.
lived$_{1st,sg,masc}$ close to Wałęsa$_{gen}$ as president$_{gen}$
'I lived close to Wałęsa (when he was) the president.'

Thus, we may conclude that prototypical adjectives and adverbs do not assign structural case.

However, there is an exception, namely the adjective *wart* 'worth', which may combine with an accusative NP, e.g., *wart złotówkę* 'worth a zloty$_{acc}$'.[31] This accusative complement is structural, according to our tests:

(5.133) a. wart dużo pieniędzy
worth much money
'woth a lot of money'

b. ta książka, nic zresztą nie warta...
this book nothing by the way NM worth
'this book, actually worth nothing...'

c. te okna, warte po 100 złotych każde...
these windows worth Dist 100 zloty each
'these windows, each worth 100 zloty...'

d. niewart złotówki / *złotówkę
NM-worth zloty$_{gen}$ / zloty$_{acc}$
'not worth a zloty'

Nevertheless, in view of the sparseness of evidence for structural ad-adjectival case, we will ignore this datum in the remainder of this Chapter, only acknowledging here that it may in the end call for extending our CASE PRINCIPLE FOR POLISH, to be developed in ensuing sections, to ad-adjectival arguments.

5.1.9 Partitive Arguments

There is a class of verbs whose single or least oblique argument is a genitive NP phrase traditionally called *logical subject* (Polish: *podmiot logiczny*), as opposed to grammatical subject

[31] Another exception could be the adjective *winien* 'owing', which apparently combines with a dative and an accusative complement, e.g., *winien Jankowi$_{dat}$ przysługę$_{acc}$* 'owing John$_{dat}$ a favour$_{acc}$'. This accusative complement shows all signs of being in a structural position; it can be realized as a *dużo*-phrase, *nic*, a distributive *po*-phrase, and it can even undergo GoN. However, it seems that this adjective can occur only as a complement of the copula (it apparently cannot occur even in other predicative positions), so it should probably be analysed as forming some kind of a complex verbal predicate with the copula.

(e.g., Szober (1953, p.307), Doroszewski and Wieczorkiewicz (1959, p.182), Klemensiewicz (1986, p.121)). These verbs constitute a semantically coherent class of verbs expressing gradual increase, decrease, lack or sufficiency: *ubywać* 'decrease, go gradually', *przybywać* 'increase, come gradually', *wystarczyć* 'suffice', *zabraknąć* 'lack, be insufficient', *nie dostawać* 'be insufficient', *zbywać* 'suffice'.

Interestingly, these genitive arguments seem to be structural according to our criteria above; they can be realized as a *dużo*-phrase, *nic* or a *po*-phrase, e.g.:[32]

(5.134) a. Ubyło dużo wody.
decreased much water
'The amount of water decreased.'

b. Nic nie ubyło.
nothing NM decreased
'Nothing decreased, we didn't lose an anything.'

c. Każdemu ubyło po trzy kilogramy.
everybody$_{dat}$ decreased Dist three kilo
'Each of them lost three kilo.'

(5.135) a. Dużo czasu mi brakowało do...
much time me$_{dat}$ lack for
'I lacked much time for...'

b. Nic nie brakuje.
nothing NM lack
'Nothing is missing.'

c. Brakowało im po kilka punktów do...
lack them$_{dat}$ Dist several points for
'Each of them lacked a few points for...'

How should such facts be analysed? We side here with Witkoś (1999),[33] who analyses all these cases as instances of partitive case, i.e., a semantically conditioned structural case (Kiparsky, 1998), similar to the optional partitive in (5.136) below:

(5.136) Dajcie mi wina / wino!
give me wine$_{gen}$ / wine$_{acc}$
'Give me (some / the) wine!'

Although we will not deal with the assignment of partitive case here (this would lead us too far into considerations of lexical semantics), we would like to point out that these partitive facts

[32]On the other hand, such genitive arguments apparently cannot be predicated of by NP[*ins*]s, although the data are not very clear:

(i) Zabrakło tylko Wojtyły ?jako Papieża / ???Papieżem.
lacked only Wojtyła$_{gen}$ as Pope$_{gen}$ / Pope$_{ins}$
'Only Wojtyła as the Pope was missing.'

[33]See also Koneczna (1949), Wierzbicka (1966) and Kubiszyn-Mędrala (1994) for some discussion.

do not require positing a separate partitive case; in Polish, unlike in some other languages (e.g., Finnish and, marginally, Russian), the partitive case does not involve distinct morphological forms. Rather, partitive case seems to be simply the structural genitive case, but triggered by semantic properties rather than purely morphosyntactic factors as in case of the Genitive of Negation, or Nominalization.

5.1.10 Summary

Table 5.2 summarizes the results of this section.

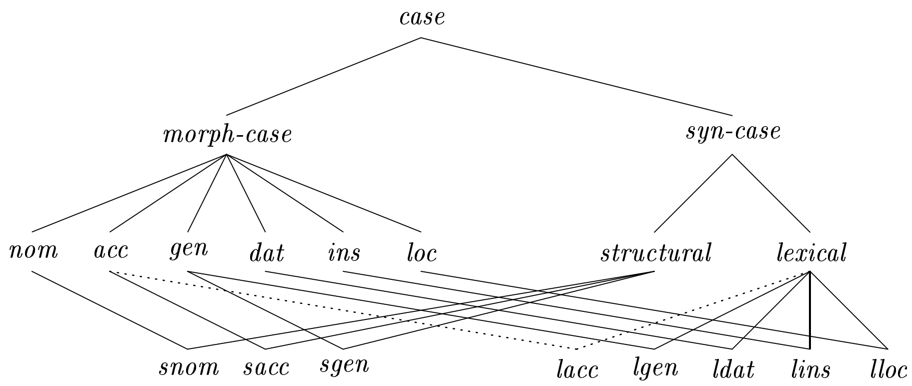
	GoN	Nominalization	*dużo*, *nic*	*po*	NP[*ins*]
ad-verbal arguments:					
nominative	−	+	+	+	+
accusative (standard case)	+	+	+	+	+
genitive of negation	+	NA	+	+	+
partitive genitive	NA	NA	+	+	?
other genitive	NA	NA	−	−	−
dative	−	−	−	−	−
instrumental	−	−	−	−	−
accusative of *boleć*, etc.	+/−	NA	NA	NA	NA
ad-nominal arguments:					
genitive of nominalization	NA	+	−	+	+
other genitive	NA	NA	−	−	−
dative	−	−	−	−	−
instrumental	−	−	−	−	−
ad-prepositional arguments:					
accusative	NA	NA	+	NA	NA
genitive	NA	NA	−	NA	NA
dative	NA	NA	−	NA	NA
instrumental	NA	NA	−	NA	NA
locative	NA	NA	−	NA	NA
ad-adjectival (and -adverbial) arguments:					
genitive	NA	NA	−	−	−
dative	NA	NA	−	−	−

Table 5.2: Tests for Structural vs. Inherent Case in Polish

Assuming, as we did in §5.1.6 above, that inherent (lexical) arguments are those whose rows do not contain any '+'s, we conclude that dative, instrumental and locative cases are always inherent. Moreover, genitive arguments of prepositions and (true) adjectives and adverbs are also always inherent, while genitive NP arguments of verbs and nouns may be inherent when assigned idiosyncratically by a given lexical item, or structural when they are genitive of negation, partitive or genitive of nominalization. On the other hand, accusative complements of verbs (including adjectival and adverbial participles) must be categorized as prototypical structural NPs, with nominative NPs and accusative complements of prepositions following the lead. Finally, we are left with the weak and inconclusive evidence for the marginal presence of the inherent accusative as complements of a small class of verbs including *boleć*.

On the basis of these results, we are justified in adopting Heinz and Matiasek's (1994) case hierarchy (given as (3.32) in §3.4.2.2) to Polish:

(5.137)



See (3.5) on p.47 for ways of enriching such case hierarchies with information pertaining to morphological case syncretisms. Another modification which might be necessary in the final version of such a type hierarchy for case is splitting the *lexical* case into truly idiosyncratic lexical case and semantic case, which is assigned according to general principles based on semantic factors (Butt and King, 1991, 1999), although it does not participate in syntactic processes described above. Since the focus of the present study is syntactic case assignment, we will not deal with such possible extensions here.

5.2 Genitive of Negation

This section is devoted to one of the most famous case assignment phenomena in the Slavic languages, the so-called Genitive of Negation. First, in §5.2.1, we will cover the basic facts, then, §5.2.2 we will look closer at what exactly triggers Genitive of Negation, and finally, in §5.2.3 we will examine the intriguing phenomenon of (apparently) long distance Genitive of Negation.

5.2.1 Basics

Genitive of Negation, i.e., the shift of a direct object's case from accusative in a non-negated clause to genitive in the negated clause, is attested in many Slavic and Baltic languages, as well as in, e.g., Gothic and Ancient Greek (Harrer-Pisarkowa, 1959; Kuryłowicz, 1971). Its origin is traditionally linked to the partitive case (see references in Harrer-Pisarkowa (1959, p.9)), although the exact synchronic relation between the genitive case in negated clauses and the partitive is a matter of contention (Kuryłowicz, 1971; Klenin, 1978; Franks and Dziwirek, 1993; Borovikoff, 1997).

In this subsection, we will recall the basic facts and propose the first version of the analysis.

5.2.1.1 Basic Data

As already illustrated in §§5.1.1–5.1.2, in Polish, the case of an otherwise accusative object of a verb changes obligatorily to genitive once the verb is negated.[34] On the other hand, complements bearing cases other than accusative are not affected by negation. The relevant examples are repeated below:

(5.8) a. Lubię Marię.
like$_{1st,sg}$ Mary$_{acc}$
'I like Mary.'

b. Nie lubię Marii / *Marię.
NM like$_{1st,sg}$ Mary$_{gen}$ / Mary$_{acc}$
'I don't like Mary.'

(5.9) a. Pomogłem Jankowi.
helped$_{1st,sg,masc}$ John$_{dat}$
'I helped John.'

b. Nie pomogłem *Janka / Jankowi.
NM helped$_{1st,sg,masc}$ John$_{gen}$ / John$_{dat}$
'I didn't helped John.'

(5.10) a. Kieruję firmą.
manage$_{1st,sg}$ factory$_{ins}$
'I run (a/the) factory.'

b. Nie kieruję *firmy / firmą.
NM manage$_{1st,sg}$ factory$_{gen}$ / factory$_{ins}$
'I don't run (a/the) factory.'

This behaviour does not depend on the form of the verb; negated infinitives, participles and *-no*/*-to* impersonals also trigger Genitive of Negation:

(5.138) a. lubić Marię (infinitive)
like$_{inf}$ Mary$_{acc}$
'to like Mary'

b. nie lubić Marii / *Marię
NM like$_{inf}$ Mary$_{gen}$ / Mary$_{acc}$
'to not like Mary'

(5.139) a. Janek, lubiący Marię (active adjectival participle)
John like$_{adjp}$ Mary$_{acc}$
'John, who likes Mary'

b. Janek, nie lubiący Marii / *Marię
John NM like$_{adjp}$ Mary$_{gen}$ / Mary$_{acc}$
'John, who doesn't like Mary'

[34]As the following sections will make clear, this is only the first approximation of the generalization.

(5.140) a. lubiąc Marię (present adverbial participle)
like$_{advp}$ Mary$_{acc}$
'liking Mary, when one likes Mary'

b. nie lubiąc Marii / *Marię
NM like$_{advp}$ Mary$_{gen}$ / Mary$_{acc}$
'when not liking Mary'

(5.141) a. polubiwszy Marię (past adverbial participle)
like$_{advp}$ Mary$_{acc}$
'having come to like Mary'

b. nie polubiwszy Marii / *Marię
NM like$_{advp}$ Mary$_{gen}$ / Mary$_{acc}$
'not having come to like Mary'

(5.142) a. Lubiono Marię. (*-no*/*-to* impersonal)
like$_{-no/-to}$ Mary$_{acc}$
'Mary was liked.'

b. Nie lubiono Marii / *Marię.
NM like$_{-no/-to}$ Mary$_{gen}$ / Mary$_{acc}$
'Mary wasn't liked.'

Apart from the idiosyncratic case of existential/locational copula (see (5.11), repeated below), the nominative subject does not change its case when the verb is negated (see (5.23)–(5.24), also repeated below).

(5.11) a. Książki są na stole.
books$_{nom}$ are on table
'(The) books are on (the/a) table.'

b. Książek nie ma na stole.
books$_{gen}$ NM has on table
'(The) books are not on (the/a) table.'

(5.23) a. Janek jest szczęśliwy.
John$_{nom}$ is happy$_{nom}$
'John is happy.'

b. *Janka nie ma/jest szczęśliwego/szczęśliwy.
John$_{gen}$ NM has/is happy$_{gen/nom}$
'John is not happy.' (intended)

(5.24) a. Janek przyszedł.
John$_{nom}$ came
'John came.'

b. *Janka nie przyszedł/przyszło.
John$_{gen}$ NM came$_{masc/neut}$
'John didn't come.' (intended)

Finally,[35] accusative NPs introduced by prepositions also do not change their case, whether the preposition is predicative (e.g., with locational meaning), or just 'case-marking'.

(5.143) a. Janek wskoczył na stół.
John jumped onto table$_{acc}$
'John jumped onto the table.'

b. Janek nie wskoczył na stół / *stołu.
John NM jumped onto table$_{acc}$ / table$_{gen}$
'John didn't jump onto the table.'

(5.144) a. Janek czekał na Marię.
John waited for Mary$_{acc}$
'John was waiting for Mary.'

b. Janek nie czekał na Marię / *Marii.
Jonh NM waited for Mary$_{acc}$ / Mary$_{gen}$
'John didn't wait for Mary.'

5.2.1.2 Basic Analysis

The basic analysis of the facts presented above is very simple: any non-initial structural argument of a verb is marked as accusative when the verb is not negated and as genitive when the verb is negated. This, together with the principle saying that the initial argument of a verb is marked nominative (as long as it is structural), gives us the following first (and incomplete) version of the CASE PRINCIPLE FOR POLISH:[36,37]

CASE PRINCIPLE FOR POLISH (first version):

(5.145)
$$\left[\begin{array}{l} \textit{category} \\ \text{HEAD}\ \textit{verb} \\ \text{ARG-ST}\ \langle \mathrm{NP}[\text{CASE}\ \textit{str}]\rangle \oplus \boxed{1} \end{array}\right] \rightarrow \left[\ \text{ARG-ST}\ \langle[\text{CASE}\ \textit{snom}]\rangle \oplus \boxed{1}\ \right]$$

(5.146)
$$\left[\begin{array}{l} \textit{category} \\ \text{HEAD}\ \left[\begin{array}{l} \textit{verb} \\ \text{NEG}\ - \end{array}\right] \\ \text{ARG-ST}\ \boxed{1}_{\textit{nelist}} \oplus \langle \mathrm{NP}[\text{CASE}\ \textit{str}]\rangle \oplus \boxed{2}_{\textit{list}} \end{array}\right] \rightarrow \left[\ \text{ARG-ST}\ \boxed{1} \oplus \langle[\text{CASE}\ \textit{sacc}]\rangle \oplus \boxed{2}\ \right]$$

(5.147)
$$\left[\begin{array}{l} \textit{category} \\ \text{HEAD}\ \left[\begin{array}{l} \textit{verb} \\ \text{NEG}\ + \end{array}\right] \\ \text{ARG-ST}\ \boxed{1}_{\textit{nelist}} \oplus \langle \mathrm{NP}[\text{CASE}\ \textit{str}]\rangle \oplus \boxed{2}_{\textit{list}} \end{array}\right] \rightarrow \left[\ \text{ARG-ST}\ \boxed{1} \oplus \langle[\text{CASE}\ \textit{sgen}]\rangle \oplus \boxed{2}\ \right]$$

(5.145) says that, for any object of type *category*, if the HEAD value of this object is *verb*, and the first element of this object's ARG-ST is a structural NP, then this first element must actually be nominative. On the other hand, (5.146)–(5.147) say that, for any verbal *category*,

[35] We will deal with long distance Genitive of Negation in §5.2.3, and with optional Genitive of Negation of measure phrases, in §10.2.2.1.

[36] Similar principles were postulated in Przepiórkowski (1996a,b) and Przepiórkowski and Kupść (1997a).

[37] We ignore the RAISED feature here. See (5.205)–(5.208) below for a more precise version.

any non-initial (note the *nelist*, i.e., *non-empty list*) structural NP on this category's ARG-ST is resolved to either accusative or genitive, depending on the value of the NEG feature, surreptitiously just introduced. We will have more to say about NEG in §5.2.2 below.

How does this CASE PRINCIPLE deal with examples in the previous subsection? Assuming the values of ARG-ST of the verbs *lubię* 'like$_{1st,sg}$', *pomogłem* 'helped$_{1st,sg}$', *kieruję* 'run$_{1st,sg}$' as in (5.148), the CASE PRINCIPLE above will always resolve the initial argument of these verbs to nominative (*snom*).

(5.148) a. *lubię*: [ARG-ST ⟨NP[*str*], NP[*str*]⟩]
b. *pomogłem*: [ARG-ST ⟨NP[*str*], NP[*ldat*]⟩]
c. *kieruję*: [ARG-ST ⟨NP[*str*], NP[*lins*]⟩]

Also, assuming that the presence of negation is reflected by the value of HEAD|NEG ('−' if there is no negation, '+' if there is negation), the second argument of *lubię* will be resolved to accusative (*sacc*) or genitive (*sgen*), depending on the value of its HEAD|NEG. On the other hand, since the second arguments of *pomogłem* and *kieruję* are lexical (*ldat* and *lins*, respectively), they are not constrained by the CASE PRINCIPLE above. Thus, this principle correctly accounts for examples (5.8)–(5.10)[38] and (5.138)–(5.142) of the previous subsection.

Via similar reasoning, the nominative case of subjects in (5.23)–(5.24) is accounted for.

And finally, the prepositional arguments (5.143)–(5.144) above are not affected by negation because the CASE PRINCIPLE (5.145)–(5.147) constrains only the values of structural NPs on a verb's ARG-ST, and not PPs (or prepositional ARG-ST). On the other hand, as argued in §5.1.7, the accusative case of prepositional arguments is structural, so the question arises whether prepositions resolve case values of their NP arguments to *sacc* in the lexicon, or whether they specify them as *str*, to be resolved by the CASE PRINCIPLE. Although both solutions are technically possible, we adopt here the conceptually more elegant second alternative; this way, structural case is never (at least in the cases we have examined so far) morphologically resolved in the lexicon. This position requires us to add one more clause to the CASE PRINCIPLE (5.145)–(5.147):[39,40]

(5.149) $\begin{bmatrix} \textit{category} \\ \text{HEAD } \textit{prep} \\ \text{ARG-ST } \langle \text{NP[CASE } \textit{str}] \rangle \end{bmatrix} \rightarrow \begin{bmatrix} \text{ARG-ST } \langle [\text{CASE } \textit{sacc}] \rangle \end{bmatrix}$

Before moving on to a more careful examination of the rôle of negation as a trigger of Genitive of Negation, a remark on the lexical accusative is in order. We noted in §5.1.2 (p.105) that examples (5.20)–(5.22), repeated below, suggest the marginal presence of the lexical accusative in Polish grammar.

[38]Note that these examples involve so-called *pro*-drop. We follow the suggestion of Manning and Sag (1999, pp.65–66) and assume that 'dropped *pro*s' are present on ARG-ST but absent from VALENCE features.

[39]This constraint assumes that prepositions do not take more than one argument. In view of predicative propositional phrases, which involve a complement of a preposition and a controlled subject (Pollard and Sag, 1987; Wechsler, 1997), this assumption is most probably false, and (5.149) should be (trivially) extended to deal with ARG-STs of length greater than 1.

[40]See also Franks (1995, pp.53–54) for an analysis of ad-prepositional accusative as 'default' rather than lexically assigned.

(5.20) a. Głowa ją boli.
head$_{nom}$ she$_{acc}$ aches
'Her head is aching.'

b. Głowa już ją / jej nie boli.
head$_{nom}$ already she$_{acc/gen}$ NM aches
'Her head isn't aching any more.'

(5.21) a. Stać ją było na kupno samochodu.
afford she$_{acc}$ Aux on buying car
'She could afford buying a car.'

b. Nie stać ją / jej było na kupno samochodu.
NM afford she$_{acc/gen}$ Aux on buying car
'She couldn't afford buying a car.'

(5.22) a. To ją kosztowało majątek.
this$_{nom}$ she$_{acc}$ cost fortune$_{acc}$
'This cost her a fortune.'

b. To ją / jej nie kosztowało ani grosza.
this$_{nom}$ she$_{acc/gen}$ NM cost even penny$_{gen}$
'This didn't cost her as much as a penny.'

These examples are accounted for by our CASE PRINCIPLE above once the accusative NP is subcategorized for not as a NP[*str*], but as a NP[*lacc* ∨ *str*], e.g., for *boli* 'aches':

(5.150) *boli*: [ARG-ST ⟨NP[*str*], NP[*lacc* ∨ *str*]⟩]

When the verb is not negated, the second argument of *boli* is uniformly accusative: either it is *lacc*, or *str* is resolved by the clause (5.146) of the CASE PRINCIPLE to *sacc*. On the other hand, when the verb is negated and the object is structural, (5.147) resolves *str* to *sgen*, so the second argument is either NP[*lacc*] or NP[*sgen*], i.e., either accusative or genitive.

5.2.2 What Exactly Triggers GoN?

What is the exact nature of the mysterious NEG feature of clauses (5.146)–(5.147) (p.135) of our CASE PRINCIPLE FOR POLISH? In this section we will show that it reflects the presence of the morphosyntactic negation prefix *nie* on the verb.

5.2.2.1 *Nie* as a Prefix

The preverbal *nie* is usually assumed to be a syntactic element,[41] but two recent studies, Witkoś (1998) and, especially, Kupść and Przepiórkowski (1999), independently argue for the

[41] This assumption is sanctioned orthographically: *nie* is written in Polish separately from the verb. See Bugajski (1983) for the radical proposal of always writing *nie* together with the verb.

affixal status of the verbal negation *nie*.[42] Below, we will summarize their arguments for this stance.[43]

Prosody As shown by Rubach and Booij (1985), *nie* preceding a monosyllabic verb clearly forms a prosodic unit for the purpose of lexical stress assignment (which in Polish normally falls on the penultimate syllable). This contrasts with pronominal clitics, which do not form a prosodic unit with the following verb:[44]

(5.151) NIE wiem / *Nie WIEM.
NM know / NM know
'I don't know.'

(5.152) Bo ja go ZNAM / *GO znam.
because I him_{cl} know / him know
'Because I know him.'

Word Order In Polish, nothing can separate verbal negation *nie* and the verb, not even the vulgar expletive *kurwa* 'fuck' (lit.: 'whore'), which can separate the clitic from its host:

(5.153) a. Może, kurwa, go nie wal tym łomem?!
maybe Expl him_{cl} NM batter this crowbar
'Why don't you fucking stop battering him with this crowbar?!'

b. Może go, kurwa, nie wal tym łomem?!

c. *Może go nie, kurwa, wal tym łomem?!

d. Może go nie wal, kurwa, tym łomem?!

e. Może go nie wal tym, kurwa, łomem?!

Coordination When two verbs are coordinated, clitics, e.g., the subjunctive clitic *bym* 'I would', can scope over coordination (i.e., can be interpreted as present on both verbs), while negation cannot:

(5.154) a. Chętnie bym [czytał i pisał] książki.
willingly would_{cl} read and write books

[42]Also Saloni and Świdziński (1985) assume (after Saloni (1976)) that verbal negation is a morphological category, but they change their stance in Saloni and Świdziński (1998), citing long distance Genitive of Negation facts discussed in Przepiórkowski and Świdziński (1997). (Also Menantaud (1989) and Wróbel (1998) explicitly reject the position of Saloni (1976) and Saloni and Świdziński (1985), essentially on the same grounds.) See, however, §5.2.3 for an analysis of long distance GoN compatible with the prefixal nature of verbal *nie*, and also Witkoś (1998) for a Minimalist analysis of long distance GoN assuming the prefixal status of *nie*.

[43]Verbal negation should be carefully distinguished from the constituent negation (homonymous in Polish), which does not comply with any of the observations cited here.

[44]Stress is marked with capital letters.

'I'd like to read and write books.'

b. *Nie [czytam i rozumiem] tych książek.
NM read$_{1st,sg}$ and understand$_{1st,sg}$ these books

c. [Nie czytam i nie rozumiem] tych książek.
NM read$_{1st,sg}$ and NM understand$_{1st,sg}$ these books
'I don't read or understand these books.'

Lexical Idiosyncrasies There are negated verbs which do not have positive counterparts, e.g., *nie cierpieć* 'detest', *nienawidzić* 'hate' (see §5.2.3 for some discussion). Arguably, there are also positive verbs which do not have negative counterparts, e.g., the imperative *proszę* 'please' (Saloni and Świdziński, 1985).

Negated Copula There is one verb, namely the existential/locational copula, whose morphological form is not simply the result of concatenating *nie* and the positive verb. See, e.g., (5.11) above for examples.

A Problem? The facts above constitute rather strong evidence for the affixal status of *nie*. Kupść and Przepiórkowski (1999) note, though, a possible problem for this analysis, namely what looks like stranded verbal *nie* in elliptical contexts:

(5.155) Marysia lubi Janka, a Janek Marysi nie.
Mary$_{nom}$ likes John$_{acc}$ and John$_{nom}$ Mary$_{gen}$ NM
'Mary likes John, but John doesn't like Mary.'

However, as argued by Witkoś (1998, p.238), *nie* in (5.155) is a different item than our verbal negation prefix. This is suggested by the mirror example (5.156).

(5.156) Marysia nie lubi Janka, a Janek Marysię tak.
Mary$_{nom}$ NM likes John$_{gen}$ and John$_{nom}$ Mary$_{acc}$ yes
'Mary doesn't like John, but John does like Mary.'

The argument is as follows: if *nie* in (5.155) were the preverbal negation element, than, analogously, *yes* in (5.156) should be a positive preverbal element in full clauses. This, however, is not the case; compare the grammatical (5.157) with (5.158), ungrammatical on the intended reading:

(5.157) Marysia lubi Janka, a Janek Marysi nie lubi.
Mary$_{nom}$ likes John$_{acc}$ and John$_{nom}$ Mary$_{gen}$ NM likes
'Mary likes John, but John doesn't like Mary.'

(5.158) #Marysia nie lubi Janka, a Janek Marysię tak lubi.
Mary$_{nom}$ NM likes John$_{gen}$ and John$_{nom}$ Mary$_{acc}$ yes likes
'Mary doesn't like John, but John does like Mary.'

Summary In summary, there is strong evidence for treating preverbal *nie* expressing clausal negation as a prefix, and no real known evidence for the opposite stance. In other words, it makes sense to treat negation as an inflectional category of verbal elements in Polish, an idea which we realize by positing the boolean-valued feature NEG, appropriate for HEAD values of type *verb* (or *verbal*).[45]

5.2.2.2 Morphosyntactic Negation vs. Semantic Negation

Is Genitive of Negation in Polish triggered by morphosyntactic or by semantic negation? Is there a difference between the two?

There is some evidence that it does make sense to distinguish between these two kinds of negation in Polish. It comes from certain environments involving the prefix *nie* which trigger GoN, but which do not express semantic negation.[46] Many of the facts discussed here were noticed earlier for Russian by Brown and Franks (1995) and Brown (1995, 1996, 1999), and for Polish by Przepiórkowski and Kupść (1999), others are new.

***Yes/No* Questions** As is well known, negation in polarity interrogatives may be neutralized cross-linguistically (see Przepiórkowski (1999a,d) and references therein). For example, Groenendijk and Stokhof (1997, pp.1088–9), and many authors before them, claim that the difference between (5.159A)–(5.160A) is purely pragmatic, and, somewhat tentatively, that "it is precisely the fact that from a logical semantic point of view $?\phi$ and $?\neg\phi$ express the same question, that creates the possibility for this process of pragmatic recycling of the element of negation."

(5.159) A: Is John at home?
B: Yes, he is. / *Yes, he isn't.
B: No, he isn't. / *No, he is.

(5.160) A: Isn't John at home?
B: Yes, he IS. / *Yes, he isn't.
B: No, he isn't. / *No, he is.

As argued in Przepiórkowski (1999a,d) and Przepiórkowski and Kupść (1999), matters are more complex, but it seems clear that at least on one reading, semantic negation is neutralized in *yes/no* questions. Thus, e.g., (5.161) and (5.162) may be used in the same situations with exactly the same meanings:

(5.161) Widziałeś Marysię po drodze?
saw$_{2nd,sg,masc}$ Mary$_{acc}$ on way
'Have you seen Mary on your way?'

[45] This feature would have to be present also on so-called *verbal nouns* (see fn.11 on p.108), which have complex verbal-nominal properties. See Malouf (1997) for an HPSG analysis of English gerunds, *prima facie* applicable to Polish verbal nouns.

[46] As can be verified by applying the tests mentioned in the previous subsection, *nie* in the environments discussed below is the true verbal negation prefix, rather than some homonymous element.

(5.162) Nie widziałeś Marysi po drodze?
NM saw$_{2nd,sg,masc}$ Mary$_{gen}$ on way
'Have(n't) you seen Mary on your way?'

Although semantic negation is apparently lost in (5.162) (but see Przepiórkowski and Kupść (1999) and Przepiórkowski (1999a,d) for a more careful discussion), Genitive of Negation is still present there; (5.162) would be ungrammatical with the accusative case on 'Mary'.

Other Environments Neutralizing Negation There is a number of idiosyncratic environments which require what could be called expletive or pleonastic negation. They include complements of *dopóki* 'until' and *omal* 'almost':

(5.163) Będę czekał, dopóki nie przeprosisz Marii.
Aux wait until NM apologize$_{2nd,sg}$ Mary$_{gen}$
'I'll be waiting until you apologize to Mary.'

(5.164) Omal jej nie przejechałem!
almost her$_{gen}$ NM run$_{1st,sg,masc}$ over
'I almost ran her over!'

Although the negative meaning is arguably lost in such examples, Genitive of Negation is still triggered.

Positive Morphosyntactically Negated Verbs Finally, there are some verbs which, although having positive meanings, seem to contain the negative prefix, e.g., *nienawidzić* 'hate', *niewolić* 'keep imprisoned', *niepokoić* 'disturb' (Kupść and Przepiórkowski, 1999).[47] These verbs do not have 'positive' forms, i.e., there are no verbs *nawidzić*, *wolić* or *pokoić* in contemporary Polish. Moreover, some of such verbs, e.g., *nienawidzić* and *nie cierpieć*, subcategorize for a genitive complement, an instance of Genitive of Negation, as we show presently.

First, such verbs, unlike other genitive-taking verbs, may take *dużo*-phrases and distributive *po*-phrases, which we took for an argument for the structurality of the relevant complements (see examples (5.55)–(5.61) and (5.75)–(5.79) above):

(5.165) Każdy z nich nienawidził / nie cierpiał w swoim życiu dużo ludzi / po pięć
each of them hated / detested in self's life many people / Dist five
osób.
persons
'Each of them hated / detested many / five people in the course of their lives.'

These genitive complements may also be predicated of by instrumental NPs, although for some speakers only marginally so:

[47]Other possible candidates for this class of verbs are forms such as *nie cierpieć* (+ infinitival complement) 'detest', *nie domagać* 'suffer, be ill', *nie sposób* '(be) not possible', *niepodobna* '(be) not possible' (the first two reported in Kupść and Przepiórkowski (1999)).

(5.166) ?Nienawidziłem / Nie cierpiałem Wałęsy prezydentem.
hated$_{1st,sg,masc}$ / detested$_{1st,sg,masc}$ Wałęsa$_{gen}$ president$_{ins}$
'I hated / detested Wałęsa as the president.'

Now, if these complements are structural, and if our CASE PRINCIPLE is on the right track, then these complements may bear the genitive case only if it is actually the genitive of negation, i.e., only if the governing verb is [NEG +], i.e., only if the initial *nie* on these verbs is taken to be the negative prefix.[48]

Second, such verbs, unlike other genitive-taking verbs, can induce long-distance Genitive of Negation, to be discussed in detail in §5.2.3. This is shown by contrasting the morphosyntactically negative (as we attempt to show) verb *nienawidzić*, whose complement may be either a genitive NP or an infinitival clause, with the verb *bać się* 'be afraid', with apparently analogous subcategorizing properties.[49] The striking difference between these two verbs is that, when they occur with an infinitival complement, only *nienawidzić* clearly induces GoN on the lower verb:

(5.167) Janek nienawidził całować tej dziewczyny.
John hated kiss$_{inf}$ this$_{gen}$ girl$_{gen}$
'John hated to kiss this girl.'

(5.168) Janek bał się całować tę dziewczynę / ?*tej dziewczyny.
John fear RM kiss this$_{acc}$ girl$_{acc}$ / this$_{gen}$ girl$_{gen}$
'John was afraid to kiss this girl.'

We take the grammaticality of (5.167) as a strong argument for the claim that *nienawidzić* involves a negative prefix, which in turn induces certain morphosyntactic properties. If *nie* were just an unanalysable initial segment of *nienawidzić* and the verb were analysed as assigning genitive case idiosyncratically, then it should behave just like *bać się* in (5.168).

No Semantic Negation There is an additional argument for our claim that none of the environments above expresses semantic negation, although, as argued above, they involve morphosyntactic negation, which triggers the Genitive of Negation. Namely, none of the environments above, unlike other negative environments, licenses *n*-words such as *nikt* 'nobody', *nic* 'nothing' and *żaden* 'none'. This supports our claim because, as generally acknowledged in recent literature, licensing of *n*-words (or, generally, Negative Concord) is a mainly semantic phenomenon; see Przepiórkowski and Kupść (1999) for discussion and references.[50,51]

[48] Actually, there in another possibility, which we do not consider here, namely, that such genitive arguments are obligatorily partitive.

[49] See (5.28)–(5.29) above (p.107) for examples of these verbs on their genitive-taking uses.

[50] See also Brown and Franks (1995), Brown (1995, 1996, 1999) and Witkoś (1998) for GB/MP analyses of NC in Russian and Polish, in which it is the phonetically null negative Op(erator), as semantic an entity as there can be in GB/MP, rather than directly the syntactic head of NegP, that licenses *n*-words.

[51] Przepiórkowski and Kupść (1999) mention that complements of *nienawidzić* may, for some speakers, contain *n*-words. Nevertheless, most native speakers we consulted find the contrast between (ia)–(ib) clear, and when they accept (ib), they are puzzled when asked to give the exact meaning of this sentence.

5.2.2.3 Summary

In this subsection, we have dealt with the issue of what exactly triggers GoN in Polish. The answer we have reached is that it is the morphosyntactic negative prefix *nie* that is responsible for Genitive of Negation in Polish, rather then the semantic property of negation, which—as argued by Przepiórkowski and Kupść (1999)—is responsible for Negative Concord.[52] When this morphosyntactic negative prefix is present on a verbal word, its HEAD|NEG value is '+', otherwise it is '−'. This value consequently plays a rôle in assigning accusative or genitive case to the structural complement, as specified in clauses (5.146)–(5.147) of the CASE PRINCIPLE FOR POLISH.

5.2.3 Long Distance Genitive of Negation

Finally, we move to the intriguing and ill-researched issue of long distance Genitive of Negation, where it is not a direct complement of the negated verb that occurs in the genitive case, but rather a complement of a structurally lower infinitival verb.

(5.169) Piszę listy / *listów.
write$_{1st,sg}$ letters$_{acc}$ / letters$_{gen}$
'I am writing letters.'

(5.170) Nie kazałem Marii pisać listów.
NM order$_{1st,sg,masc}$ Mary$_{dat}$ write$_{inf}$ letters$_{gen}$
'I didn't order/ask Mary to write letters.'

(5.171) Nie chciałem pisać listów.
NM wanted$_{1st,sg,masc}$ write$_{inf}$ letters$_{gen}$
'I didn't want to write letters.'

(5.172) Nie wydawał się pisać listów.
NM seem RM write$_{inf}$ letters$_{gen}$
'He didn't seem to be writing letters.'

As examples (5.170)–(5.172) show, long distance Genitive of Negation (LD GoN) occurs alike in object-control, subject-control and raising to subject environments.[53] The examples below

(i) b.. Janek nikomu nie lubi pomagać.
John nobody$_{dat}$ NM likes help$_{inf}$
'John doesn't like helping anybody.'

a. ?*Janek nikomu nienawidzi pomagać.
John nobody$_{dat}$ hates help$_{inf}$
'John hates helping anybody.' (intended)

[52]This result directly falsifies those analyses which strongly couple GoN and Negative Concord, e.g., the Definite Clause Grammar (DCG) analysis of Przepiórkowski and Świdziński (1997) and Świdziński (1998, 1999a), in which NPs bearing the genitive of negation case are treated as, essentially, *n*-words.

[53]Sadly, raising to object (also called *ECM* and *AcI*) environments disappeared from Polish in the 18th century (Klemensiewicz, 1985, p.627).

show that there seems to be no limit to the structural distance between the negated verb and the genitive complement:

(5.173) Nie chcę kazać mu zamiatać pokoju.
NM want$_{1st,sg}$ order$_{inf}$ him$_{dat}$ sweep$_{inf}$ room$_{gen}$
'I don't want to order him to sweep the room.'

(5.174) Nie musisz zamierzać przestać studiować algebry.
NM must$_{2nd,sg}$ intend$_{inf}$ stop$_{inf}$ study$_{inf}$ algebra$_{gen}$
'You don't have to intend to stop studying algebra.'

Moreover, negating any of the verbs in such 'Verb Clusters' triggers GoN on the complement of the lowest verb:[54]

(5.175) a. Mogę chcieć to napisać.
may$_{1st,sg}$ want$_{inf}$ this$_{acc}$ write$_{inf}$
'I might want to write this.'

b. Nie mogę chcieć tego napisać.
NM may$_{1st,sg}$ want$_{inf}$ this$_{gen}$ write$_{inf}$

c. Mogę nie chcieć tego napisać.
may$_{1st,sg}$ NM want$_{inf}$ this$_{gen}$ write$_{inf}$

d. Mogę chcieć tego nie napisać.
may$_{1st,sg}$ want$_{inf}$ this$_{gen}$ NM write$_{inf}$

On the other hand, clauses introduced by complementizers, whether finite or infinite, are barriers to LD GoN:

(5.176) Janek nie chciał, żeby to / *tego opisać.
John NM wanted Comp this$_{acc}$ / this$_{gen}$ describe$_{inf}$
'John didn't want one/us to describe this.'

(5.177) Nie mówiłem, że to / *tego lubię.
NM said$_{1st,sg,masc}$ Comp this$_{acc}$ / this$_{gen}$ like$_{1st,sg}$
'I didn't say I liked it.'

This much seems to be well known.[55] In the four subsections below, we will present more ephemeral data concerning LD GoN, look at possible analyses of these data, adopt one of them, and check this analysis for compatibility with other modules of the grammar.

[54] By 'Verb Clusters' we will mean syntactic structures consisting of verbs and their dependents such that the verbs constitute a chain in the following sense. A set of verbs in a syntactic structure constitute a chain iff they can be ordered in a list $\langle v_1, \ldots, v_n \rangle$ such that, for each pair $\langle v_i, v_{i+1} \rangle$ ($i = 1, \ldots, n-1$), a complementizerless phrase projected by v_{i+1} is subcategorized for by v_i.

[55] For some analyses, see, e.g., Dziwirek (1994) (Relational Grammar), Przepiórkowski and Kupść (1997c) (HPSG), Przepiórkowski and Świdziński (1997) (DCG), Tajsner (1990) and Witkoś (1996a, 1998) (GB/MP).

5.2.3.1 Empirical Generalizations

There are two families of facts concerning LD GoN which are far less known than the facts presented above. Below, we will discuss them in turn.

Optional LD GoN Most theories of Genitive of Negation assume that LD GoN is obligatory, just like local GoN; this is the position of, e.g., Tajsner (1990), Dziwirek (1994), Witkoś (1996a, 1998), Przepiórkowski and Kupść (1997a,c) and Przepiórkowski and Świdziński (1997). Curiously, negative examples supporting this assumption are hardly ever given, although Przepiórkowski and Świdziński (1997, p.20) adduce (5.178) and Saloni and Świdziński (1998, p.157) cite (5.179).

(5.178) *Piotrek nie chciał widzieć Marię.
Peter NM wanted see$_{inf}$ Mary$_{acc}$
'Peter didn't want to see Mary.' (intended)

(5.179) *Musisz nie zamierzać przestać studiować algebrę.
must NM intend$_{inf}$ stop$_{inf}$ study$_{inf}$ algebra$_{acc}$
'You cannot intend (lit: you must [not intend]) to stop studying algebra.'(intended)

For Dziwirek (1994), Witkoś (1996a, 1998) and Przepiórkowski and Kupść (1997c), such facts constitute an argument for some kind of a clause union analysis of Polish 'Verb Clusters'.

The facts are not that simple, though. For example, Saloni and Świdziński (1985, p.142) give the following grammatical datum:[56]

(5.180) Nie mógłbyś przestać studiować algebrę?
NM could$_{2nd,sg}$ stop$_{inf}$ study$_{inf}$ algebra$_{acc}$
'Couldn't you stop studying algebra?'

It should be noted that in (5.180), the accusative alternates with the genitive; to our ears both (5.180) and (5.181) are acceptable.

(5.181) Nie mógłbyś przestać studiować algebry?
NM could$_{2nd,sg}$ stop$_{inf}$ study$_{inf}$ algebra$_{gen}$
'Couldn't you stop studying algebra?'

A similar, but attested[57] example is given below.

(5.182) Nie wystarczy nacisnąć guzik.
NM suffices press$_{inf}$ button$_{acc}$
'It's not enough to press a button.'

[56]This example disappears in Saloni and Świdziński (1998).
[57]It is a newspaper headline (*Gazeta Wyborcza*, number 159, 11th July 1999).

Again, all native speakers we consulted find this example acceptable, most actually judge it as clearly better than a similar sentence with the genitive *guzika* in place of *guzik*, although some prefer the genitive version.

In fact, as the data collected by Rybicka-Nowacka (1990) show, LD GoN clearly contrasts with local GoN in being in principle optional.

Rybicka-Nowacka (1990) reports the results of a survey conducted on a sample of 227 students of last grades of secondary school and students of the 4th year of Polish philology. The subjects were given a collection of sentences containing a negated verb and a verb (the same or lower) normally taking an accusative complement, and they were asked to put the complement in accusative or genitive.

In case of local GoN, only 2–3% of subjects chose the accusative, which may be interpreted as random (statistical) error. This confirms the usual characterization of local GoN as involving *obligatory* shift from accusative to genitive. However, in case of LD GoN, some 30–40% of subjects chose the accusative. Here are some examples:

(5.183) Czy nie można by sklepy (37%) / sklepów (63%) zaopatrzyć w artykuły
Q NM may Cond shops$_{acc}$ / shops$_{gen}$ supply with articles
chemiczne?
chemical

'Couldn't one supply shops with chemical articles?'

(5.184) Jan nie uważał za stosowne kupować samochód (29%) / samochodu (71%).
John NM considered as appropriate buy$_{inf}$ car$_{acc}$ / car$_{gen}$

'John didn't consider it appropriate to buy a car.'

(5.185) Nie uważał sobie za ujmę zamienić z nią kilka słów (45%) /
NM considered him$_{dat}$ as dishonour exchange$_{inf}$ with her a couple$_{acc}$ words /
kilku słów (55%).
a couple$_{gen}$ words

'He didn't think it was below him to exchange a couple of words with her.'

(5.186) Nie sposób sprawdzić im bilety (37%) / biletów (63%).
NM possible check$_{inf}$ them$_{dat}$ tickets$_{acc}$ / tickets$_{gen}$.

'It's impossible to check their tickets.'

It seems extremely unlikely that the accusative in such cases is a result of some processing problem. First, these results are based on a survey conducted among conscious speakers of Polish, rather than being based on naturally occurring instances of spontaneous error-infested speech. Second, many speakers prefer the accusative even when the noun is linearly close to the negated verb, as in (5.183), and in case of very simple sentences, as in (5.186). Third, the numbers reported seem to be too high to be interpretable as processing difficulties.

Moreover, the alternation between genitive and accusative in such LD GoN cases is sanctioned prescriptively. As Rybicka-Nowacka (1990) reports, although early prescriptive publications such as Passendorfer (1905), Krasnowolski (1920) and Szober (1937) recommended using the genitive case, more recent works, such as Gaertner *et al.* (1961), Buttler *et al.* (1971) and Doroszewski and Kurkowska (1973), explicitly (although conditionally, see the works cited here for details) allow the complement of an infinitival verb to retain its accusative case when a higher verb is negated.

On the other hand, there are cases when LD GoN is almost obligatory. For example, Rybicka-Nowacka (1990) gives the following datum:[58]

(5.187) Nie skończyłem jeszcze czytać książkę (7%) / książki (93%).
NM finished$_{1st,sg,masc}$ yet read$_{inf}$ book$_{acc}$ / book$_{gen}$
'I haven't finished reading the/a book yet.'

We will have nothing to say about the reasons of acceptability of the accusative in some cases, and the relative unacceptability in other cases, especially since the data are very murky here. The conclusion that we will draw from the data given above is that the (morpho-)syntax should, in principle, allow LD GoN to be optional, although in particular cases other (probably semantic and pragmatic) factors may decide between the two options.

Multiple GoN Another usually unnoticed quirk of LD GoN is the possibility of *multiple* GoN, as in (5.188)

(5.188) a. Janek uczył Marię lepić garnki.
John taught Mary$_{acc}$ mold$_{inf}$ pots$_{acc}$
'John taught Mary how to make pottery.'

b. Janek nie uczył Marii lepić garnków.
John NM taught Mary$_{gen}$ mold$_{inf}$ pots$_{gen}$
'John didn't teach Mary how to make pottery.'

The verb *uczyć* 'teach' (as well as its perfective counterpart *nauczyć*) is claimed[59] to be the only object control verb in Polish taking an accusative NP and an infinitival clause. Other such verbs take a *dative* NP, see, e.g., (5.170) on p.143. However, there is a family of subject control constructions which involve an accusative NP and an infinitival complement, namely periphrastic verbs headed by the light verb *mieć* (lit.: 'have'), e.g., *mieć zamiar* 'intend' (lit.: 'have intention'), *mieć obowiązek* 'have obligation', *mieć ochotę* 'like, want' (lit.: 'have liking'), etc.:

(5.189) Mam zamiar napisać list.
have$_{1st,sg}$ intention$_{acc}$ write$_{inf}$ letter$_{acc}$
'I intend to write a letter.'

(5.190) Mam obowiązek poinformować ją o tym.
have$_{1st,sg}$ obligation$_{acc}$ inform$_{inf}$ her$_{acc}$ about it
'I have the obligation to inform her about it.'

[58] See also (5.178)–(5.179) above.
[59] See, e.g., Dziwirek (1994, p.95).

(5.191) Mam ochotę obejrzeć ten film.
have$_{1st,sg}$ liking$_{acc}$ watch$_{inf}$ this film$_{acc}$
'I feel like watching this film.'

How do we know that in these examples *mam* is the head verb which takes two complements, i.e., an accusative NP and an infinitival complement? First, it is clear that the infinitival complement is a complement of the verb and not of the noun; the relevant observation is that there is no NP *zamiar napisać list*, etc., and that the object of the lower verb can be fronted, i.e., extracted out of the alleged NP:[60]

(5.192) a. *twój zamiar napisać list
your intention write$_{inf}$ letter$_{acc}$
'your intention to write a letter' (intended)

b. twój zamiar, żeby napisać list / ?napisania listu
you intention Comp write$_{inf}$ letter$_{acc}$ / write$_{grnd}$ letter$_{gen}$
'your intention to write a letter'

(5.193) a. Co masz zamiar napisać __?
what have$_{2nd,sg}$ intention$_{acc}$ write$_{inf}$
'What do you intend to write?'

b. ?*Czego wysoko cenisz [pisanie __]?
what$_{gen}$ highly regard$_{2nd,sg}$ writing
'Writing what do you regard highly?'

Second, the contentive noun (*zamiar*, *obowiązek* and *ochotę* in (5.189)–(5.191)) cannot be analysed as forming some kind of morphological unit with the light verb *mieć*. This noun can both be separated from the verb (cf. (5.194)) and head a complex NP (cf. (5.195)):

(5.194) Miał kiedyś Janek zamiar napisać list, ale zapomniał.
had$_{3rd,sg,masc}$ once John$_{nom}$ intention$_{acc}$ write$_{inf}$ letter$_{acc}$ but forgot$_{3rd,sg,masc}$
'John intended to write a letter once, but he forgot.'

(5.195) Janek ma [bardzo poważny i długo już żywiony zamiar] napisać list.
John has very serious and long already cultivated intention$_{acc}$ write$_{inf}$ letter$_{acc}$
'John has very seriously and for a long time intended to write a letter.'

Additionally, these constructions are clearly headed by the light verb *mieć*: it agrees with the subject, it is tensed, etc.

Now that we established that light verb constructions in (5.189)–(5.191) are headed by the light verb which subcategorizes for a contentive accusative NP and for an infinitival complement,

[60] In Polish, extraction out of NPs (including verbal nouns, as below) is in general infelicitous, unless very heavy stress is put on the extracted phrase.

we can show that such constructions also lead to multiple GoN; compare (5.196)–(5.198) below with (5.189)–(5.191) above.[61]

(5.196) Nie mam zamiaru pisać listu.
NM have$_{1st,sg}$ intention$_{gen}$ write$_{inf}$ letter$_{gen}$
'I don't intend to write a letter.'

(5.197) Nie mam obowiązku informować jej o tym.
NM have$_{1st,sg}$ obligation$_{gen}$ inform$_{inf}$ her$_{gen}$ about it
'I don't have any obligation to inform her about it.'

(5.198) Nie mam ochoty oglądać tego filmu.
NM have$_{1st,sg}$ liking$_{gen}$ watch$_{inf}$ this film$_{gen}$
'I don't feel like watching this film.'

Of course, 2 is not a limit to the number of genitive of negation NPs:

(5.199) Nie mam ochoty uczyć Marii lepić garnków.
NM have$_{1st,sg}$ liking$_{gen}$ teach$_{inf}$ Mary$_{gen}$ mold$_{inf}$ pots$_{gen}$
'I don't feel like teaching Mary how to make pottery.'

It is interesting to examine the interaction of optionality of LD GoN with such multiple GoN environments. The generalizations so far predict that the highest accusative NP in (5.199), being an immediate complement of the negated verb, must be genitive, but the lower accusative complements should be allowed to alternate between the accusative and the genitive case. These predictions are confirmed, but with a twist:

(5.200) *Nie mam ochotę uczyć Marię/Marii lepić garnki/garnków.
NM have$_{1st,sg}$ liking$_{acc}$ teach$_{inf}$ Mary$_{acc/gen}$ mold$_{inf}$ pots$_{acc/gen}$

(5.201) Nie mam ochoty uczyć Marii lepić garnki.
NM have$_{1st,sg}$ liking$_{gen}$ teach$_{inf}$ Mary$_{gen}$ mold$_{inf}$ pots$_{acc}$
'I don't feel like teaching Mary how to make pottery.'

(5.202) ?Nie mam ochoty uczyć Marię lepić garnki.
NM have$_{1st,sg}$ liking$_{gen}$ teach$_{inf}$ Mary$_{acc}$ mold$_{inf}$ pots$_{acc}$
'I don't feel like teaching Mary how to make pottery.'

(5.203) ???Nie mam ochoty uczyć Marię lepić garnków.
NM have$_{1st,sg}$ liking$_{gen}$ teach$_{inf}$ Mary$_{acc}$ mold$_{inf}$ pots$_{gen}$
'I don't feel like teaching Mary how to make pottery.'

[61] The replacement of the lower verb by its imperfective counterpart in (5.196)–(5.198) does not affect case assignment.

The twist is that the example (5.203), with genitive matrix complement, accusative middle complement and again genitive downstairs complement, is often, but not always, felt as less grammatical than the other three combinations of possible case assignment to the lower two complements (i.e., (5.199) and (5.201)–(5.202)). A comprehensive analysis of Polish GoN should be able to deal with such data.

5.2.3.2 Possible Analyses

The problem with long distance Genitive of Negation is not that it is difficult to analyse it, but that there are too many possible technically sound HPSG analyses available. Among the possible alternatives are:

Extending the Domain of Case Assignment to Arguments of Lower Verbs This solution is adopted by Witkoś (1996a, 1998) (within the GB/MP framework), who postulates LF incorporation of lower verbs to higher verbs as a mechanism responsible for extending the domain of case assignment. In HPSG, extending the domain of case assignment could be done by positing relational constraints of the kind made available by RSRL (Richter, 1997, 1999b; Richter *et al.*, 1999), which would have to check values of higher verbs' NEG feature before resolving the case of a structural complement of a lower verb.

Such an account, although technically possible, would have a number of drawbacks:

- it would be blatantly non-local;
- it would be very heterogeneous: the non-local principle responsible for resolving the case of structural complements (to accusative or genitive) would be much more complex than the principles responsible for assigning the nominative case to subjects or the accusative to complements of prepositions;
- it is not clear whether the obligatoriness of local GoN and the optionality of LD GoN could be derived (rather than stipulated);
- it is not clear whether the acceptability (for some speakers) of (5.203) could be accounted for in such an analysis.[62]

Negation Percolates Downstairs This solution, adopted in the DCG account of Przepiórkowski and Świdziński (1997) and Świdziński (1998, 1999a) (which modify an earlier analysis in Świdziński (1992a)), would require the [NEG +] verbs to (optionally, unlike in the works just cited) mark the infinitival verbs they subcategorize for also as [NEG +]. This way negation could 'percolate' down to a certain level.[63] This account would fare better than the previous alternative on the locality issue (basically, the CASE PRINCIPLE (5.145)–(5.147) and (5.149) would remain almost unchanged), but it would also contain certain flaws:

[62] Such examples seem to pose a serious problem for the analysis of Witkoś (1996a, 1998); if the domain of case assignment is extended to the complement of the lowest verb, also the complement of the middle verb is in this domain, so it should also bear the genitive case.

[63] A similar solution is adopted in Neidle's (1988) account for LD GoN in Russian, where the feature [Q], induced by negation and triggering GoN, percolates downstairs.

- the strict correspondence between the presence of the negative prefix *nie* and the '+' value of NEG would be lost; lower verbs could be marked as [NEG +] when a higher verb is negated even if they themselves do not contain the negative prefix;

- one would have to posit a non-trivial principle 'calculating' the value of a verb's NEG; see Przepiórkowski and Świdziński (1997).

Argument Composition Finally, a solution developed by Dziwirek (1994, 1998) (within the Relational Grammar framework) and, independently, by Przepiórkowski and Kupść (1997a,c) (in HPSG) is based on the idea that in Polish, arguments of lower verbs in 'Verb Clusters' somehow become arguments of higher verbs. If the higher verb is negated, all its structural arguments are assigned the genitive case, even those that originated on lower verbs. Among the advantages of such an approach are:

- its locality; once an argument is raised to a negated verb, CASE PRINCIPLE can assign genitive of negation locally;

- correspondence between the presence of *nie* and the value of NEG remains intact;

- the optionality of LD GoN may follow from the optionality of raising; once an argument is (optionally!) raised to a negated verb, it is assigned genitive case obligatorily.

The potentially problematic question for this analysis (as well as for other analyses mentioned above) is following:

- are there independent arguments for such an argument composition analysis?

Acknowledging that all these three types of analyses may be formalized in HPSG, we will concentrate below, in §5.2.3.3, on the argument composition analysis, as most promising both conceptually and technically. Then, in §5.2.3.4 we will try to answer the 'independent arguments' question above.

5.2.3.3 Argument Composition Analysis

Within HPSG, argument composition was first formalized by Hinrichs and Nakazawa (1990, 1994a).[64] According to their analysis, argument composition happens courtesy of appropriate lexical entries of verbs taking infinitival complements. A schematic (and rough) description of a lexical entry of such an argument composition verb is given below:

(5.204) $$\begin{bmatrix} \textit{word} \\ \text{SS}|\text{LOC}|\text{CAT} & \begin{bmatrix} \text{HEAD} & \textit{verb} \\ \text{SUBCAT} & \left\langle \begin{bmatrix} \textit{synsem} \\ \text{LOC}|\text{CAT} & \begin{bmatrix} \text{HEAD} & \textit{verb}[\textit{inf}] \\ \text{SUBCAT} & \boxed{1} \end{bmatrix} \end{bmatrix} \right\rangle \oplus \boxed{1} \end{bmatrix} \end{bmatrix}$$

[64] Preprints of these papers can be found in Hinrichs and Nakazawa (1994b).

This AVM describes a verb which subcategorizes for a an infinitival verbal complement and takes over the list of requirements of this complement (given here as $\boxed{1}$).[65]

Note that, actually, a lexical entry such as (5.204) will trigger *optional* raising of arguments of the lower verb. This is because the *word* vs. *phrase* status of the infinitival complement is not determined in this lexical entry. This means that the verb described by (5.204) may either combine with a *word*, whose subcategorization requirements are not satisfied (i.e., whose SUBCAT list $\boxed{1}$ is non-empty) — in this case the arguments of the *word* are raised and become arguments of the higher verb; or it may combine with a *phrase* — in this case the argument of the lower verb are realized downstairs, i.e., $\boxed{1}$ in (5.204) is an empty list.[66]

Below, we will show that argument composition is a more complex issue in present-day HPSG and suggest possible ways of formalizing it for our purposes, and we will put forward our analysis of long distance Genitive of Negation.

The Locus of Argument Composition: VALENCE vs. ARG-ST? A verb described by the lexical entry (5.204) raises elements of the lower verb's SUBCAT to its own SUBCAT. In current HPSG, however, following the influential paper(s) Manning and Sag (1998, 1999),[67] the functionality of SUBCAT is split between ARG-ST on one hand, and VALENCE features SUBJ, COMPS and SPR, on the other: binding is defined in terms of ARG-ST, dropped arguments (*pro*'s) are dropped only from VALENCE, not from ARG-ST, etc. As argued in the previous Chapter, also case assignment should be defined on ARG-ST, and not on VALENCE features. On the other hand, VALENCE attributes are directly responsible for constituent realization of arguments. See also Manning and Sag (1998, 1999) for other reasons for dissociating ARG-ST and VALENCE, and for references.

Taking into account this split, how should argument composition be encoded? There are, *prima facie*, a number of options:[68]

- arguments are raised on both VALENCE and ARG-ST;
- arguments are raised only on VALENCE (i.e., from lower VALENCE to higher VALENCE);
- arguments are raised only on ARG-ST (i.e., from lower ARG-ST to higher ARG-ST);
- arguments are raised from lower VALENCE to higher ARG-ST;
- arguments are raised from lower ARG-ST to higher VALENCE.

For our purposes, only some of these options make sense. Since we analyse case assignment as taking place on ARG-ST, and because we want to have an account of long distance Genitive

[65] Recall that '$\oplus$' abbreviates the append (or list concatenation) relation.

[66] Of course, depending on what kinds of constituent structures are allowed by the grammar, intermediate options may also be possible, i.e., some arguments may be realized downstairs and others may be raised.

[67] Earlier versions of this paper were widely circulated as early as in 1995.

[68] Strictly logically, there are more possibilities than listed here, e.g., raising from ARG-ST to VALENCE and, at the same time, from VALENCE to ARG-ST. We will ignore these possibilities.

of Negation as an actually local phenomenon, we must allow lower arguments to appear on a higher ARG-ST. That is, we are left with the following options:[69]

- arguments are raised on both VALENCE and ARG-ST;
- arguments are raised only on ARG-ST;
- arguments are raised from lower VALENCE to higher ARG-ST.

In fact, all of these options can be found in current HPSG literature, although some in disguise. Thus, Przepiórkowski and Kupść (1997c) assume that Polish 'Verb Clusters' involve both raising on VALENCE and raising on ARG-ST, although the latter is restricted when negation is present.[70] Abeillé *et al.* (1998b), on the other hand, show that French needs both raising on ARG-ST (*a-composition* in their terminology), and raising from VALENCE to ARG-ST (*c-composition*); the former is triggered by tense auxiliaries, the latter by causative verbs. Finally, the analysis of Meurers (1999b) mentioned in the previous Chapter, although formulated in terms of SUBCAT, can be translated into the VALENCE/ARG-ST framework as involving raising on ARG-ST even when the corresponding argument on VALENCE has been configurationally realized.

Since a careful analysis of Polish 'Verb Clusters' and various clause union effects would require a dissertation of its own, we remain agnostic as to which of these options we should choose, but see §5.2.3.4 below for some data which may shed some light on this issue.

An Analysis of LD GoN Our full analysis of LD GoN consists of two points:

- in Polish 'Verb Clusters', arguments of lower verbs may optionally raise to become arguments of a higher verb's ARG-ST;
- structural case is assigned locally via the CASE PRINCIPLE FOR POLISH, whose two relevant clauses are repeated below.

(5.146) $$\begin{bmatrix} \textit{category} \\ \text{HEAD} \begin{bmatrix} \textit{verb} \\ \text{NEG} \; - \end{bmatrix} \\ \text{ARG-ST} \; \boxed{1}_{nelist} \oplus \langle \text{NP}[\text{CASE } \textit{str}] \rangle \oplus \boxed{2}_{list} \end{bmatrix} \rightarrow \begin{bmatrix} \text{ARG-ST} \; \boxed{1} \oplus \langle [\text{CASE } \textit{sacc}] \rangle \oplus \boxed{2} \end{bmatrix}$$

(5.147) $$\begin{bmatrix} \textit{category} \\ \text{HEAD} \begin{bmatrix} \textit{verb} \\ \text{NEG} \; + \end{bmatrix} \\ \text{ARG-ST} \; \boxed{1}_{nelist} \oplus \langle \text{NP}[\text{CASE } \textit{str}] \rangle \oplus \boxed{2}_{list} \end{bmatrix} \rightarrow \begin{bmatrix} \text{ARG-ST} \; \boxed{1} \oplus \langle [\text{CASE } \textit{sgen}] \rangle \oplus \boxed{2} \end{bmatrix}$$

[69] Although we reject it here, an analysis in terms of raising on VALENCE may make sense in accounting for 'clause union' effects to do with word order. In fact, this is how the LFG analysis of *instructive* constructions in Urdu given in Butt (1995) may be represented in HPSG. As argued in Butt (1995), instructive constructions should be distinguished from *permissive* constructions, which would probably involve raising both on VALENCE and on ARG-ST.

[70] See below for an analysis similar to Przepiórkowski and Kupść (1997c).

Note, however, that this principle differs slightly from the approach to case assignment developed in the previous Chapter. There, we argued that case should not be assigned to just any NP[*str*] element on ARG-ST, but only to those structural NPs which are not raised to a higher ARG-ST (see §4.5). Polish LD GoN is yet another phenomenon where this matters.

To see why this matters, consider the simple example (5.171), repeated below.

(5.171) Nie chciałem pisać listów.
NM wanted$_{1st,sg,masc}$ write$_{inf}$ letters$_{gen}$
'I didn't want to write letters.'

In this sentence, *listów* 'letters' originates as an argument of the lower verb, i.e., *pisać* 'write', and raises to the higher verb, i.e., *nie chciałem* 'not wanted$_{1st,sg,masc}$'. This means that it is present on two ARG-STs; that of a positive verb *pisać*, and that of a negative verb *nie chciałem*. This, in turn, means that this argument will be assigned case twice: it will be assigned the accusative case by (5.146) operating on the lower verb, and the genitive case by (5.147) applied to the higher verb. This, of course, should render the sentence (5.171) ungrammatical.

However, the problem disappears as soon as we apply the analysis of Chapter 4. If case is assigned only to those NP[*str*] elements of an ARG-ST which are not raised to a higher ARG-ST, than case can be assigned to the argument *listów* only on its highest occurrence, i.e., on the ARG-ST of *nie chciałem*. Since this is a negated verb, the case of *listów* will correctly be resolved to the genitive.

Of course, in order for this analysis to work, we have to slightly reformulate our original CASE PRINCIPLE FOR POLISH in (5.145)–(5.147) and (5.149), adding information about the 'raisedness' status of potential case assignees. Employing the convention of abbreviating $\begin{bmatrix} \text{ARG XP} \\ \text{RAISED } \alpha \end{bmatrix}$ to XP$^{\alpha}$, we may modify our original CASE PRINCIPLE FOR POLISH as follows:

CASE PRINCIPLE FOR POLISH (second version):

(5.205) $$\begin{bmatrix} \textit{category} \\ \text{HEAD } \textit{verb} \\ \text{ARG-ST } \langle \text{NP}^{-}[\text{CASE } \textit{str}]\rangle \oplus \boxed{1} \end{bmatrix} \rightarrow \begin{bmatrix} \text{ARG-ST } \langle[\text{CASE } \textit{snom}]\rangle \oplus \boxed{1} \end{bmatrix}$$

(5.206) $$\begin{bmatrix} \textit{category} \\ \text{HEAD } \begin{bmatrix} \textit{verb} \\ \text{NEG } - \end{bmatrix} \\ \text{ARG-ST } \boxed{1}_{\textit{nelist}} \oplus \langle \text{NP}^{-}[\text{CASE } \textit{str}]\rangle \oplus \boxed{2}_{\textit{list}} \end{bmatrix} \rightarrow \begin{bmatrix} \text{ARG-ST } \boxed{1} \oplus \langle[\text{CASE } \textit{sacc}]\rangle \oplus \boxed{2} \end{bmatrix}$$

(5.207) $$\begin{bmatrix} \textit{category} \\ \text{HEAD } \begin{bmatrix} \textit{verb} \\ \text{NEG } + \end{bmatrix} \\ \text{ARG-ST } \boxed{1}_{\textit{nelist}} \oplus \langle \text{NP}^{-}[\text{CASE } \textit{str}]\rangle \oplus \boxed{2}_{\textit{list}} \end{bmatrix} \rightarrow \begin{bmatrix} \text{ARG-ST } \boxed{1} \oplus \langle[\text{CASE } \textit{sgen}]\rangle \oplus \boxed{2} \end{bmatrix}$$

(5.208) $$\begin{bmatrix} \textit{category} \\ \text{HEAD } \textit{prep} \\ \text{ARG-ST } \langle \text{NP}^{-}[\text{CASE } \textit{str}]\rangle \end{bmatrix} \rightarrow \begin{bmatrix} \text{ARG-ST } \langle[\text{CASE } \textit{sacc}]\rangle \end{bmatrix}$$

A Problem The above analysis faces one empirical problem: it wrongly analyses 'Verb Clusters' where a lower verb is negated, e.g.:

(5.209) Mogłem nie robić tego / *to dalej.
could$_{1st,sg,masc}$ NM do$_{inf}$ this$_{gen}$ / this$_{acc}$ anymore
'I could have refrained from doing that.'

The problem is that, according to our analysis so far, the structural complement of the negated lower verb may be raised to the higher verb and be assigned the accusative case there, contrary to judgements. This suggests that, in Polish, negation should block (any further) argument raising, just as it does in Italian and other Romance languages.[71]

There are various ways this restriction can be imposed. The technically simplest is perhaps dropping '$^-$' form the NP[*str*] in principle (5.207) responsible for GoN, i.e., having the old version (5.147) instead. The effect of this would be that negated verbs assign genitive case to their NP[*str*] arguments unconditionally, i.e., ignoring the future raising fate of this NP. This would effectively block such arguments from being raised to a higher positive verb; if they were so raised, they would be assigned the accusative case by (5.206) and the familiar case clash would result. On the other hand, such an argument could be raised to a higher negated verb (even if it passes a positive verb on its way); it would simply be assigned the same genitive case again.[72]

However, for conceptual reasons, we will settle for a separate principle blocking raising from negated verbs. This principle is given below:

(5.210) NO RAISING ACROSS NEGATION:

$$\begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} \\ \text{NEG} & + \end{bmatrix} \\ \text{ARG-ST} & \langle \boxed{0} \rangle \oplus \boxed{1} \end{bmatrix} \rightarrow \boxed{1} = \text{list}(\text{XP}^-)$$

This principle makes different empirical predictions then our previous putative alternative: it stops all non-subject arguments from being raised higher, not just the NP[*str*] objects.[73] We will see below some evidence that this is indeed the right prediction (see (5.236)–(5.237) on p.163).

It should be clear that this analysis works fine for the case assignment facts discussed so far, including optional LD GoN (this is guaranteed by the optionality of raising) and multiple GoN (a structural NP complement verb may raise to a higher ARG-ST which already contains a structural NP). How does it deal, though, with the optionality of LD GoN in multiple GoN environments, especially with the problematic (5.203), repeated below?

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[71] See Kim (1996) for an HPSG analysis of Italian facts and for further references.

[72] But this raising to higher negative verbs might be blocked by adding '$^-$' to the NP[*sgen*] at the right hand side of (5.147).

[73] Note that subjects may be raised across negation, as in:

(i) Janek wydawał się nie być zachwycony tym pomysłem.
John$_{nom}$ seemed RM NM be$_{inf}$ delighted$_{nom}$ this$_{ins}$ idea$_{ins}$
'John seemed not to be delighted with this idea.'

(5.203)???Nie mam ochoty uczyć Marię lepić garnków.
NM have$_{1st,sg}$ liking$_{gen}$ teach$_{inf}$ Mary$_{acc}$ mold$_{inf}$ pots$_{gen}$
'I don't feel like teaching Mary how to make pottery.'

If sentences like this are judged as ungrammatical, then optional raising to a higher ARG-ST in Polish must be analysed as an 'all or nothing' affair: either all arguments of a verb are raised to a higher verb, or none is. In (5.203), the accusative case of *Marię* shows that this argument of *uczyć* has not been raised to the higher verb *mam*, so—by hypothesis—no argument of *uczyć* may be raised to *mam*, including the perhaps raised argument of the lower verb. This means that *garnków* should in fact be in the accusative case.

On the other hand, if (5.203) is grammatical, then argument raising should be an individual matter of particular arguments, i.e., some arguments may raise, and other may stay downstairs. Adopting this option, (5.203) may be explained by saying that, although the accusative argument of the middle verb *uczyć* stayed on the verb, the argument of the lowest verb *lepić* raised first to the middle verb *uczyć*, and then to the highest verb *mam*, leaving its co-argument on the ARG-ST of *uczyć* behind. Thus, our analysis may be parameterized to account for whatever is the grammaticality of (5.203).

Below, we will turn to the question whether the optional argument composition in Polish 'Verb Clusters' that our analysis assumes can be supported (or falsified) by other phenomena.

5.2.3.4 Other Clause Union Effects

LD GoN is often cited as part of the evidence that 'Verb Clusters' form a monoclausal / 'clause union' environment (Dziwirek, 1994, 1998; Witkoś, 1996a, 1998). All phenomena given as evidence for this claim are local in the sense that they cannot occur across a clear clause boundary (i.e., a clause boundary which contains a complementizer), while they can occur in such 'Verb Clusters', even across many verbal projections. In case of Genitive of Negation, the relevant contrast was given above, see (5.170)–(5.174) vs. (5.176)–(5.177).

Also our analysis may be understood as an optional 'clause union' analysis, where 'clause union' is technically implemented as argument composition. If so, then two questions immediately arise:

- Can the analysis above account also for other 'clause union' phenomena?
- Do other phenomena support our analysis of verbal negation as a barrier to 'clause union'?

Below, we will first briefly look at these other 'clause union' phenomena, and then we will (positively) answer these two questions.

Negative Concord (NC) As often noted in the literature (Dziwirek, 1994, 1998; Witkoś, 1996a, 1998; Przepiórkowski and Kupść, 1997a,c,b), Polish *n*-words, such as *nikt* 'nobody', *nic* 'nothing' and *nigdy* 'never', cannot be licensed by negation across true clauses (5.211)–(5.212), but they can be licensed long-distance in 'Verb Clusters' (5.213)–(5.214):[74]

(5.211) *Jan **nie** narzekał, że poinformowano go o **niczym**.
John NM complained that informed$_{-no/-to}$ him about nothing

(5.212) *Jan **nie** prosił, żeby **niczego** ruszać w jego pokoju.
John NM asked that nothing touch$_{inf}$ in his room

(5.213) Jan *(**nie**) chciał **niczego** kupować.
John NM wanted nothing buy$_{inf}$
'John didn't want to buy anything.'

(5.214) Jan *(**nie**) chciał próbować **nikogo** pokochać.
John NM wanted try$_{inf}$ nobody love$_{inf}$
'John didn't want to try to love anybody.'

Scrambling and Extraction Dziwirek (1994, 1998) and Witkoś (1996a, 1998) note that, although extraction out of clauses introduced by complementizers is often problematic, extraction out of infinitival verbal projections is completely fine, e.g.:[75]

(5.215) *Kogo on powiedział, że Janek zaprosił __?
who$_{acc}$ he said that John invited
'Who did he say that John invited?' (intended)

(5.216) Kogo Janek kazał Ewie zaprosić __?
who$_{acc}$ John ordered Eve$_{dat}$ invite$_{inf}$
'Who did John order/ask Eve to invite?'

Dziwirek (1994, 1998) also notes that similar facts hold for relative clauses, as well as for extracting non-*wh* elements (which she calls *scrambling*).

Clitic Climbing (CC) A similar phenomenon, but usually described separately, is 'Clitic Climbing' (CC): it is allowed in 'Verb Clusters', but not across true clause boundaries. Witkoś (1996a,b, 1998) illustrates this with pronominal clitics, Dziwirek (1994, 1998) with so-called 'floating inflection'. The pronominal clitic examples, from Witkoś (1998, p.298), are given below.

(5.217) *Maria go chce, żeby Jan widział __.
Mary him$_{cl}$ want Comp John see
'Mary wants him to be seen by John.' (intended)

(5.218) Maria go chce widzieć __.
Mary him$_{cl}$ wants see$_{inf}$
'Mary wants to see him.'

[74] The examples come from Przepiórkowski and Kupść (1997a).
[75] See Dziwirek (1994, pp.246–248).

Haplology Another argument for a 'clause union' analysis of 'Verb Clusters' comes from haplology of the so-called reflexive marker *się*.[76,77] In brief, when two or more verbs occur with *się*, the reflexive marker may be realized just once in the case of 'Verb Clusters', but not when a true clause boundary intervenes. In the examples below (based on Kupść (1999c, p.104)), *stara się* 'tries' and *spóźniać się* 'be late' are *reflexiva tantum*.

(5.219) Jan stara się, żeby mniej spóźniać *(się) do pracy.
John tries RM Comp less be late RM to work
'John tries not to arrive so late at work.' or
'John tries for one not to arrive so late at work.'

(5.220) Jan stara się mniej spóźniać (się) do pracy.
John tries RM less be late RM to work
'John tries not to arrive so late at work.'

Note that only in the latter sentence is haplology possible.

Binding Dziwirek (1994, 1998) cites another clause-bounded phenomenon, i.e., binding. The examples below show that an anaphor cannot be bound across a true clause boundary, but it can be bound long distance in 'Verb Clusters'.[78,79]

(5.221) Piotr$_i$ powiedział, że Ewa$_k$ złożyła wizytę swoim$_{k/*i}$ rodzicom.
Peter$_{nom}$ said Comp Eve$_{nom}$ paid visit Self$_{poss}$ parents$_{dat}$
'Peter said that Eve visited her parents.' but not:
*'Peter said that Eve visited his parents'

(5.222) Piotr$_i$ polecił Ewie$_k$ złożyć wizytę swoim$_{k/i}$ rodzicom.
Peter$_{nom}$ told Eve$_{dat}$ pay$_{inf}$ visit Self$_{poss}$ parents$_{dat}$
'Peter told Eve to visit her parents.' or:
'Peter told Eve to visit his parents.'

Clause Union and the Analysis of GoN The overwhelming generalization concerning case assignment in Polish (and, perhaps, cross-linguistically), i.e., that case assignment is a strictly local phenomenon in the sense of being a relation between a head and its immediate arguments, suggested an analysis of so-called long distance Genitive of Negation as involving 'clause union' in a rather strong sense: arguments of lower verbs raise to become arguments of higher verbs. Do other 'clause union' phenomena force equally strong understanding of 'clause union'? The short answer is: some of them do, other do not.

[76] It was not noted either by Dziwirek (1994, 1998) or by Witkoś (1996a, 1998), but it is extensively discussed in Fowler (1993), Rappaport (1997), and, especially, Kupść (1999c).

[77] As the examples below make clear, this marker does not always reflixivize the verb; in the case of *reflexiva tantum*, it is apparently meaningless.

[78] This kind of binding, not as local as that in English, but also not as unconstrained as that in Chinese, is often called 'middle-distance binding', see the papers in Koster and Reuland (1991).

[79] See also Dziwirek (1994, 1998) for similar facts concerning the control of the fixed expression *po pijanemu* 'when drunk'.

Below, we will show that in the case of some of these phenomena (extraction, binding, NC), 'clause union' does not suffice to describe their locality constraints and a more general account is called for, which may in the end be independent of the issue of whether 'Verb Clusters' involve argument composition or not. In the case of other phenomena (clitic climbing, haplology of *się*), some kind of argument composition seems to be needed, though. We will look a little more carefully at these other phenomena and examine their interaction with our analysis above. The conclusion we will draw is that, although clitic climbing and haplology do not confirm our analysis, they also do not necessarily falsify it.

Extraction Extraction differs from other phenomena in actually being non-clause-bounded. Although there is some controversy as to what exactly can be extracted out of what kinds of clauses,[80] extraction of complements out of *żeby*-clauses is generally accepted by native speakers, e.g.:

(5.223) Kogo chciałbyś, żeby wybrali __ prezydentem?
who$_{acc}$ want$_{subj}$ Comp elect$_{3rd,pl}$ president
'Who would you want them to elect as president?'

Moreover, a well known feature of Polish is that it violates the Left Branch Condition (Borsley, 1983b,a):

(5.224) Czyjego chciałbyś zobaczyć brata?
whose want$_{2nd,sg}$ see brother
'Whose brother would you like to see?'

'Clause union' does not shed any light on either of these properties of *wh*-extraction/fronting; they require a much more general analysis of *wh*-extraction, which may in the end be compatible with either position on the fine structure of 'Verb Clusters'.

Binding Similarly, binding is a much less local phenomenon than the analyses in Dziwirek (1994, 1998) and Witkoś (1996a, 1998) would suggest. Binding supports the argument composition analysis of 'Verb Clusters' insofar it can be claimed that an anaphor must be a co-argument of its binder. But, in view of facts discussed in Marciniak (1999), this would be a very controversial claim. A rather striking example, from Marciniak (1999, p.131), is given below:

(5.225) Jan$_i$ pokazał Piotrowi dom córki brata swojego$_i$ kolegi.
John showed Peter house$_{acc}$ daughter$_{gen}$ brother$_{gen}$ Self$_{poss}$ colleague
'John showed Peter the house of the daughter of his (John's) colleague.'

In order to make the possessive anaphor *swojego* a co-argument of *Jan*, it would have to be raised across a number of NP projections, a rather controversial idea. Thus, although binding in Polish seems to be clause-bounded, it may be clearly non-local. If so, binding as evidence

[80] See §8.2.

for argument composition becomes questionable (if not simply void).[81] For this reason, we will ignore binding facts in considerations below.

Negative Concord (NC) NC facts strikingly resemble those of binding.[82] As shown by Przepiórkowski and Kupść (1997a,b), NC also can operate across NP and PP projections:

(5.226) *(Nie) lubię smaku konfitur z owoców z **niczyjego** ogrodu, oprócz
NM like$_{1st,sg}$ taste preserves$_{gen}$ from fruits from nobody's garden, apart
własnego.
my own
'I don't like the taste of preserves made of fruit from anybody's garden, apart from (these made of fruit from) my own.'

Again, it would be very controversial to claim that *niczyjego* must raise (across 6 NP and PP projections) to *lubię* in order to be licensed.[83]

Clitic Climbing (CC) So-called 'Clitic Climbing' (CC), i.e., the occurrence of a clitic argument of a lower verb on a higher verb, is a much more local phenomenon than either binding or NC (not to mention extraction): not only cannot a clitic cross a true clausal boundary, as illustrated in (5.217) above, but it also cannot cross an NP boundary:

(5.227) a. Janek chwalił się wypiciem całego kufla piwa jednym łykiem.
John boasted RM drinking [whole tankard beer] one gulp$_{ins}$
'John boasted of drinking a tankard of beer in a single gulp.'

b. *Janek się go chwalił wypiciem __ jednym łykiem.
John RM him$_{cl}$ boaster drinking one gulp$_{ins}$

Actually, the strongest argument for treating 'Clitic Climbing' as involving some kind of argument composition comes from data such as (5.228), discussed in Rappaport (1997) and Kupść (1999c) (but not in Witkoś (1996b, 1998)):

(5.228) Bać zaczniemy się go po wyborach.
fear$_{inf}$ start$_{1st,pl}$ RM him$_{cl}$ after elections
'We will start being afraid of him (only) after the elections.'

Such examples seem to violate the generalization that clitics (including *się*) required by a verb can appear either before the verb or immediately after the verb that subcategorizes for them, see the ungrammaticality of (5.229).

[81] For example, assuming the constructional approach of Sag (1997) and Ginzburg and Sag (1998), one possible alternative would be to assume that binding cannot cross a *clausal* phrase, although it may cross other kinds of phrases, including VP[*inf*] phrases. Another, worked out, proposal can be found in Marciniak (1999).

[82] In fact, the influential approach of Progovac (1988, 1994) treats NC in binding-theoretic terms.

[83] An analysis of NC as an unbounded dependency, accounting for these facts, is offered in Przepiórkowski and Kupść (1997a,b). See also Przepiórkowski and Kupść (1999) for improvements.

(5.229) ?*Baliśmy długo się go po wyborach.
fear$_{1st,pl}$ long RM him$_{cl}$ after elections
'We were afraid of him long after the elections.' (intended)

The difference between (5.228) and (5.229) is that, in (5.228), the verb *bać* is separated from *się* and *go* by a structurally higher verb, *zaczniemy*.

On the analysis of 'Clitic Climbing' as involving argument composition, the generalization can be maintained: the clitics in (5.228) do occur immediately after the verb whose arguments they are; see Kupść (1999c) for an HPSG analysis.

Although the facts are more complex than presented here,[84] we take CC as symptomatic of some kind of argument composition.

Haplology of się Haplology also may be analysed via argument raising. One possible problem with this solution is that haplology seems to be allowed across NP boundaries; the (verbal) noun *wylegiwanie się* 'lolling about' and the verb *bać się* 'fear' are *reflexiva tantum*.

(5.230) Bałem się tego ciągłego wylegiwania ?(się) w łóżku.
fear$_{1st,sg,masc}$ RM this constant lolling about RM in bed
'I was afraid of this constant lolling about in bed.'

Nevertheless, for the sake of argument, we tentatively accept the spirit of such an analysis and assume that haplology of *się* involves some kind of argument composition.

Argument Composition Revisited If CC and haplology are the only (apart from LD GoN) relatively clear symptoms of argument composition, and if negation blocks argument composition, then we might expect both CC and haplology to be impossible when verbal negation intevenes. Interestingly, this expectation is rather strikingly confirmed in case of CC, but not in case of haplology.

As far as **CC** is concerned, Witkoś (1998, p.193) claims that intervening negation does *not* block clitic climbing and gives the following datum:

(5.231) Kapitan go mógł nie bić.
captain him$_{cl}$ could not beat
'The captain might not beat him.'

In (5.231) the clitic pronoun which is a semantic argument of the lower negated verb is realized on the higher verb, apparently escaping negation. However, there is an alternative analysis of (5.231) which is readily available, namely that the placement of the clitic in (5.231) is the result of linearization, rather then climbing. The evidence for the plausibility of such an analysis comes from the fact that a clitic can be realized on any (appropriately heavy) constituent

[84] In fact, the clitic does not have to appear on a verb; roughly, it may appear in any preverbal position, i.e., also on non-verbal elements, or immediately after the verb; see (5.232)–(5.233) below; see also Witkoś (1996b, 1998).

to the left of the verb from which it originates (and within the clause). In particular, it can actually appear on a *lower* verb, provided this lower verb occurs to the left from the matrix verb, as in (5.232), or within a constituent, as in (5.233) (and, possibly, also (5.232)).

(5.232) Wstać jej z łóżka kazałem.
get up$_{inf}$ her$_{cl}$ from bed ordered$_{1st,sg,masc}$
'I ordered her to get up.'

(5.233) Piękną mu marynarkę chciałam kupić.
beautiful him$_{cl}$ jacket wanted$_{1st,sg,fem}$ buy$_{inf}$
'I wanted to buy him a beautiful jacket.'

As noted above, a strong argument for clitic climbing is provided by the contrast in (5.228)–(5.229), which shows that a clitic can be realized on an item to the right of its semantic governor only when this item is a higher verb; an exception readily explained by clitic climbing. So, in order to determine whether negation blocks raising or not, we should look at facts like those. Although the judgements are not always clear, the relevant data show that negation does block clitic climbing.

(5.234) a. Próbowałem wystraszyć go wczoraj.
tried$_{1st,sg,masc}$ frighten$_{inf}$ him$_{cl,acc}$ yesterday
'I tried to frighten him yesterday.'

b. Wystraszyć próbowałem go wczoraj.
frighten$_{inf}$ tried$_{1st,sg,masc}$ him$_{cl,acc}$ yesterday
'I tried to frighten him yesterday.'

(5.235) a. Próbowałem nie wystraszyć go wczoraj.
tried$_{1st,sg,masc}$ NM frighten$_{inf}$ him$_{cl,gen}$ yesterday
'I tried not to frighten him yesterday.'

b. ?*Nie wystraszyć próbowałem go wczoraj.
NM frighten$_{inf}$ tried$_{1st,sg,masc}$ him$_{cl,gen}$ yesterday
'I tried not to frighten him yesterday.'

c. ?Nie wystraszyć go próbowałem wczoraj.
NM frighten$_{inf}$ him$_{cl,gen}$ tried$_{1st,sg,masc}$ yesterday
'I tried not to frighten him yesterday.'

Examples (5.234a–b) show that, when there is no negation present, the lower verb can be preposed leaving the clitic behind, on a higher verb. On the other hand, (5.235a–b) show that, when negation is present, the negated verb cannot easily front and leave the clitic behind. Finally, (5.235c) shows that, when the negated verb fronts together with the clitic, the result is clearly improved.

These data confirm our analysis, in which optional raising in Polish is blocked by intervening negation.

Interestingly, similar judgments hold in the case of dative clitics, which are not subject to our Case Principle, cf. (5.236)–(5.237) below. This confirms our analysis of negation blocking optional raising of any arguments, cf. the NO RAISING ACROSS NEGATION principle (5.210) above.

(5.236) a. Próbowałem dokuczać mu wczoraj.
tried$_{1st,sg,masc}$ tease$_{inf}$ him$_{cl,dat}$ yesterday
'I tried to tease him yesterday.'

b. Dokuczać próbowałem mu wczoraj.
tease$_{inf}$ tried$_{1st,sg,masc}$ him$_{cl,dat}$ yesterday
'I tried to tease him yesterday.'

(5.237) a. Próbowałem nie dokuczać mu wczoraj.
tried$_{1st,sg,masc}$ NM tease$_{inf}$ him$_{cl,dat}$ yesterday
'I tried not to tease him yesterday.'

b. ?*Nie dokuczać próbowałem mu wczoraj.
NM tease$_{inf}$ tried$_{1st,sg,masc}$ him$_{cl,dat}$ yesterday
'I tried not to tease him yesterday.'

c. ?Nie dokuczać mu próbowałem wczoraj.
NM tease$_{inf}$ him$_{cl,dat}$ tried$_{1st,sg,masc}$ yesterday
'I tried not to tease him yesterday.'

On the other hand, the **haplology** data seem to point towards the opposite conclusion; as the example below shows, haplology over negation is possible.

(5.238) Jan stara się nie spóźniać (się) do pracy.
John tries RM NM be late RM to work
'John tries not to be late to work.'

Does that invalidate our analysis of LD GoN in terms of optional argument composition? Not necessarily. There are two lines of defence. First, recall that haplology differs from CC in being allowed across a (verbal) nominal boundary; recall the contrast between (5.227) and (5.230). In fact, haplology seems to be allowed also across a prepositional boundary:

(5.239) Przyzwyczaiłem się do wylegiwania ?(się) w łóżku.
got used$_{1st,sg,masc}$ RM to lolling about RM in bed
'I got used to this lolling about in bed.'

Since argument raising across nominal and prepositional boundaries seems to be a controversial idea, we could question the correctness of an analysis of haplology in terms of argument composition.

The other line of defence would be to accept not only the spirit of the analysis of haplology in Kupść (1999c), but also its letter. According to that analysis, there is a special VALENCE attribute RFL, which is dedicated to *się*. This attribute has its own idiosyncratic behaviour and, in particular, its elements may raise independently of other arguments. Assuming this analysis, we could posit that, although negation blocks ordinary argument raising, it does not affect the behaviour of RFL.

Finally, if everything else fails, we could capitalize on the distinction between raising on ARG-ST and raising on VALENCE. LD GoN involves, as we argued above, raising to ARG-ST, but it is logically possible that CC and/or haplology of *się* involve raising on VALENCE, i.e., independently of ARG-ST raising. In fact, this is how they are analysed in Kupść (1999b,a,e). Such an analysis, if on the right track, would provide one more interesting reason for dissociating VALENCE and ARG-ST: it is possible that, although argument composition may happen simultaneously on both, certain factors (verbal negation in our case) may block argument composition on ARG-ST without blocking it on VALENCE.

Again, resolving these issues would require a dissertation of its own, so we will stop here.

5.2.4 Summary of GoN

In this section, we presented a comprehensive analysis of Genitive of Negation in Polish, accounting for a wide range of facts including those usually neglected in the literature.

Apart from providing a principle responsible for local structural case assignment, including local GoN (§5.2.1), we closely looked into the nature of the trigger of GoN. We came to the conclusion that what is responsible for GoN in Polish is the morphosyntactic negation realized as a verbal prefix. We then looked into so-called long distance GoN pointing out two ill-researched aspects of this phenomenon, i.e., its optionality and its possible multiplicity. We argued that, in order to account for LD GoN, our initial case assignment rules need to be modified only slightly, and that these modifications actually assimilate the CASE PRINCIPLE to the general approach to case assignment developed in the previous Chapter. On our account, LD GoN is actually a subcase of the garden variety local GoN, where its apparently long-distance character stems from argument composition occurring in 'Verb Clusters', and its optionality is the result of the optionality of such argument composition.

Finally, we compared LD GoN to 'Clitic Climbing' and to the haplology of *się*, we saw that CC, but not haplology, supports our analysis of optional raising as being blocked by verbal negation, and we suggested possible ways of reconciling the haplology data with the LD GoN data.

5.3 Case Assignment in Numeral Phrases

The syntax of numeral phrases[85] is about the most controversial topic in Slavic linguistics; the data are exceedingly complex and heterogeneous, and there is no agreement on how to analyse them, either within Slavic as a group, or within particular Slavic languages.[86]

[85]For the time being we will use the term *numeral phrase* in an intuitive sense, without smuggling in any ideas about the internal structure of such numeral phrases, but in §5.3.1.2 we will see that they are really headed by numerals.

[86]See Franks (1994b, 1995) for a general comparison of Russian, Serbo-Croatian, and Polish. Parts of the material presented in this section can be found in Przepiórkowski (1996a, 1997b) (see also Czuba and Przepiórkowski (1995)). Other references to works on numeral phrases in various Slavic languages will be

Below, we will attempt to introduce the complexity gradually. First, in §5.3.1, we will deal with the group of numerals most often discussed in Slavic linguistics, i.e., with *pięć* 'five'-type numerals, then we will extend the analysis to other numerals, §5.3.2, and we will end with a summary in §5.3.3.

An issue concerning numeral phrases which will be conspicuous by its absence in this section is the syntax of complex numerals, such as *tysiąc siedemset dziewięćdziesiąt pięć* '1795'; see Gruszczyński and Saloni (1978), Gruszczyński (1986), and Rutkowski (1999).[87] Another matter we say very little about is historical development of the numeral system in Polish; see Szober (1928), Łoś (1928), and Klemensiewicz (1930, 1985).

5.3.1 *Pięć*-Type Numerals

This class of lexemes consists of so-called main numerals (Polish: *liczebniki główne*) higher than or equal to 5, but with the exception of *tysiąc* 'thousand', *milion* 'million', etc. The two most curious things about Polish numerals of the *pięć*-type are their lack of agreement with the verb and their heterogeneous internal structure.

The former property is illustrated in (5.240):

(5.240) Pięciu facetów weszło do kina.
five guys entered$_{3rd,sg,neut}$ into cinema
'Five guys entered the cinema.'

Although the subject, *pięciu facetów* is plural and masculine, the verb occurs in the 'default' 3rd person singular neuter form.

The latter property is illustrated in Table (5.241) below.

(5.241) Non-Virile Declension of *pięć* 'five':

	five	*women*
NOM	pięć$_{?nom/?acc}$	kobiet$_{gen}$
ACC	pięć$_{acc}$	kobiet$_{gen}$
GEN	pięciu$_{gen}$	kobiet$_{gen}$
DAT	pięciu$_{dat}$	kobietom$_{dat}$
INS	pięciu/pięcioma$_{ins}$	kobietami$_{ins}$
LOC	pięciu$_{loc}$	kobietach$_{loc}$

What this Table shows is that, in syntactic positions typical for the nominative and accusative cases, the numeral seems to govern the noun and assign it the genitive case (the nominative/accusative form of 'women' is *kobiety*), while in dative, instrumental and locative positions, the numeral agrees with the noun.[88] The situation in genitive positions, on the

given below.

[87]In HPSG, such complex numerals (in American English) are analysed in Smith (1999).

[88]Here, as throughout this study we ignore the vocative case. (In brief, numeral phrases in vocative have the same form as in nominative/accusative positions.)

other hand, may be interpreted either way: either the numeral assigns the genitive case to the noun, or it agrees with the noun.

In the three subsections below, we will attempt to shed some light on these two curious facts about the behaviour of Polish *pięć*-type numerals. We will first look closer at numeral phrases in apparently nominative positions (§5.3.1.1), then we will investigate the structure of Polish numeral phrases (§5.3.1.2), and finally we will present an HPSG analysis which elegantly accounts for these quirky facts (§5.3.1.3).

5.3.1.1 The Case of Subject Numeral Phrases

Numerals, as a morphosyntactic (as opposed to semantic or purely syntactic) class may be defined as containing exactly those lexemes which inflect for case and gender, but not for number (Saloni and Świdziński, 1985, 1998). In fact, numerals belonging to the *pięć*-class show a two-way gender distinction: virile (traditionally called *męskoosobowe* 'masculine-human', marked as *m1* in Saloni and Świdziński (1985, 1998)) and non-virile (traditionally called *niemęskoosobowe* 'non-masculine-human').[89] We saw the non-virile part of the paradigm in (5.241); the virile part is shown in (5.242) below.

(5.242) Virile Declension of *pięć* 'five':

	five	*guys*
NOM	pięciu$_{?nom/?acc/?gen}$	facetów$_{gen}$
ACC	pięciu$_{?acc/?gen}$	facetów$_{gen}$
GEN	pięciu$_{gen}$	facetów$_{gen}$
DAT	pięciu$_{dat}$	facetom$_{dat}$
INS	pięciu/pięcioma$_{ins}$	facetami$_{ins}$
LOC	pięciu$_{loc}$	facetach$_{loc}$

Now, due to the syncretism of numeral forms, there is a considerable controversy in Polish linguistics as to how such numeral phrases in subject positions (the NOM row above; see also (5.240)) should be interpreted, and in particular, what the case of the numeral is.[90] The most popular positions are:

- the **nominative** hypothesis: the numeral in subject positions is always nominative;
- the **nominative/genitive** hypothesis: the numeral in such positions is nominative in case of non-virile gender (cf. (5.241)) and genitive in case of virile gender (cf. (5.242));

[89] See §2.2.1. According to Saloni and Świdziński (1985, 1998), so-called collective numerals, such as *pięcioro*, belong to the paradigm of numeral lexemes such as *pięć* 'five' and are specified as *n1* (a subclass of neuter) or *p-3* (a subclass of *plurale tantum*). Since this idea turned out to be controversial (see, e.g., Laskowski (1984b, pp.290–292) and the discussion and references in Mieczkowska (1994, pp.7–8)), and because of certain subcategorization differences between *pięć*-type and *pięcioro*-type numerals, we discuss the latter separately, in §5.3.2.2 below.

[90] This issue is less controversial in case of Russian, where it is generally assumed that the numeral occurs in the nominative case, e.g., Babby (1980b, 1986, 1987, 1988), but also rather unclear in case of Serbo-Croatian, where numeral subjects have been analysed as nominative, although lacking overt case morphology (Wechsler and Zlatić, 1999), accusative (Babby, 1980b), genitive (Zlatić, 1997b, p.153), and caseless (Franks, 1986).

- the **accusative-impersonal** hypothesis: the numeral is always accusative, although the phrase is not a subject, but rather a measure adverbial (hence, the accusative of measure);
- the **accusative-subject** hypothesis: the numeral is always accusative (and it is a true subject).

The **nominative** hypothesis is represented mainly by works of Zygmunt Saloni, Marek Świdziński, and their colleagues, and it is made explicit, e.g., in Saloni (1976, 1977), Gruszczyński and Saloni (1978), Szpakowicz and Świdziński (1981, 1990), Saloni and Świdziński (1985, 1998), Andrejewicz (1996) and Kopcińska (1997). Since this position is in accord with the assumption that subjects are always nominative in Polish, and with the intuition that numeral phrases in examples such as (5.240) above are real subjects, this is by far the most popular stance. Apart from the works cited above, it is also assumed or argued for in Schabowska (1967, 1970), Laskowski (1984a), Strutyński (1997), Markowski (1999), somewhat inconclusively in Grzegorczykowa (1998), and also in some Chomskyan works, e.g., Tajsner (1990), Willim (1990), and Bobrowski (1998), as well as in Relational Grammar, Dziwirek (1990, 1994). Below, we will show that this hypothesis, when worked out in detail, leads to considerable complications in the grammar and, hence, should be abandoned.

The **nominative/genitive** hypothesis is assumed in some traditional Polish linguistics, e.g., Doroszewski and Wieczorkiewicz (1959), Klemensiewicz (1968) and Bartnicka and Satkiewicz (1990), but also more recently in Mieczkowska (1994). It is based on the observation that, in the virile declension, the form of the numeral in nominative (and accusative) position is the same as its form in genitive. This hypothesis, unlike the nominative hypothesis, accounts for certain modification facts discussed below. Nevertheless, it is strikingly *ad hoc* and a more principled solution should be preferred, if it can be found.

The **accusative-impersonal** hypothesis has a long history; to the best of our knowledge, it was first formulated by Małecki (1863), and more recently defended by Schenker (1971).[91] It is easy to show, though, that it cannot be maintained, essentially because numeral phrases which are apparent subjects are actually *real* subjects.

Finally, the **accusative-subject** hypothesis is voiced in passing by Szober (1928, 1953) and Franks (1994b, 1995, 1998b), although neither defends it in detail. It will be carefully defended below.[92] Let us first see, however, why the other hypotheses should be rejected.

Against the Accusative-Impersonal Hypothesis According to this hypothesis, sentences involving numeral 'subjects', such as (5.240) above and (5.245)–(5.251) below, are really subject-less impersonal constructions, and the apparent numeral subject is probably some kind of a measure adverbial, specifying the unrealized subject. This hypothesis neatly explains the 3rd singular neuter feature on the verb (impersonal constructions normally involve 3rd singular neuter verbs in Polish, see (5.243) below), as well as the apparently accusative case of the numeral (measure NPs are often in the accusative case, see (5.244)).

[91] See also references in Schenker (1971).

[92] Franks (1994b, 1995, 1998b) seems to reach this conclusion unaware of Szober (1928, 1953). The same conclusion was later reached by Przepiórkowski (1996a, 1997b) (earlier published as a chapter in Czuba and Przepiórkowski (1995)), also independently of either Szober (1928, 1953), or Franks (1994b, 1995, 1998b).

(5.243) a. Tam było ciepło.
there was$_{3rd,sg,neut}$ warm
'It was warm there.'

b. Grało się na gitarze.
play$_{3rd,sg,neut}$ RM on guitar
'One used to play guitar.'

(5.244) a. Chleb kosztował złotówkę.
bread cost zloty$_{acc}$
'The bread cost one zloty.'

b. Czekałem godzinę.
waited$_{1st,sg,masc}$ hour$_{acc}$
'I was waiting for an hour.'

However, this hypothesis is wrong because numeral phrases in (5.240) above and (5.245)–(5.251) below clearly are subjects. First, such a numeral phrase may be an antecedent of a reflexive anaphor, a property restricted to subjects in Polish:[93]

(5.245) Pięciu facetów zobaczyło się/siebie w lustrze.
five guys$_{gen}$ saw RM/Self in mirror
'Five guys saw themselves in the mirror.'

An attempt at explaining (5.245) by saying that the reflexive anaphor is bound by an unrealized subject, which happens to be co-indexed with the alleged numeral adverbial is doomed: such an explanation runs counter to condition C of binding theory, which clearly holds for Polish (and does not distinguish between complements and adjuncts, see §8.4):

(5.246) *On$_i$ spał w domu Janka$_i$.
he slept in house John$_{poss}$
'John was sleeping in his own house.' (intended)

Thus, the co-indexation of the alleged numeral adverbial in (5.245) with the putative subject would violate condition C, just as it is violated in (5.246).

Second, the subject numeral phrase may control *po pijanemu* 'when drunk' and adverbial clauses:[94]

(5.247) Pięciu facetów po pijanemu skoczyło z mostu.
five guys$_{gen}$ when drunk jumped from bridge
'Five guys jumped from a bridge while drunk.'

[93](5.245) involves both a short (RM) and a long (Self) form of the reflexive anaphor.

[94]See Dziwirek (1994) for argumentation that these two properties are restricted to subjects. According to Dziwirek (1994), the control of adverbial clauses is a strong indication of subjecthood (she argues within the Relational Grammar framework, that it is a test for final 1-hood, while, e.g., anaphor binding and control of *po pijanemu* are tests for (not necessarily final) 1-hood).

(5.248) Pięciu facetów szło śpiewając.
five guys$_{gen}$ walked singing
'Five guys walked singing.'

Third, in passive constructions, the numeral phrase is realized as a *przez* 'by'-phrase, just as other subjects, see (5.249). If it were some kind of a subject-oriented adverbial phrase, it could be expected to remain as an accusative adverbial, just as the subject-oriented adverbial *niechętnie* 'reluctantly' in (5.250).[95]

(5.249) Ten film był obejrzany *(przez) pięciu facetów.
this film$_{nom}$ was see by five guys$_{gen}$
'This film was seen by five guys.'

(5.250) Maria była niechętnie badana przez lekarza.
Mary was reluctantly examined by doctor
'Mary was reluctantly examined by the doctor.'

Fourth, the subject numeral phrase may be coordinated with a nominative phrase, which is clearly a subject:[96]

(5.251) Do kina poszło pięciu facetów i ich bracia.
to cinema went$_{3rd,sg,neut}$ five guys$_{gen}$ and their brothers$_{nom}$
'Five guys and their brothers went to the cinema.'

The option of a nominative subject being coordinated with an adverbial is not available in Polish:[97]

(5.252) *Na Marię czekał Janek i godzinę.
for Mary waited$_{1st,sg,masc}$ John$_{nom}$ and hour$_{acc}$
'John waited an hour for Mary.' (intended)

Finally, if sentences involving apparent numeral subjects were really impersonal, we would expect an instrumental adjective or an apparently dative semi-predicate *sam* 'alone' in copular constructions, as examples b. below show:

[95]See, e.g., McConnell-Ginet (1982) on subject-oriented adverbials.

[96]In (5.251) the verb 'agrees' with the closest conjunct, as it often does in Polish, cf. Kallas (1974, 1993). See Szpakowicz and Świdziński (1981, 1990) and, especially, Kopcińska (1997) for numerous examples of coordination of a numeral phrase and a (numeral-free) nominative phrase in the subject position.

[97]The conjunction *i* should be carefully distinguished from the homonymous discourse particle meaning 'even', which could be used in an example similar to (5.252):

(i) Na Marię czekałby Janek i godzinę.
for Mary waited$_{subj,1st,sg,masc}$ John$_{nom}$ even hour$_{acc}$
'When it comes to Mary, John would wait for her even an hour.'

See, e.g., Walasiuk (1998, p.168).

(5.253) a. Janek jest miły.
John$_{nom}$ is nice$_{nom}$
'John is nice.'

b. Było się miłym / *miły.
was$_{impers}$ RM nice$_{ins}$ / nice$_{nom}$
'One was nice.'

(5.254) a. Oni byli sami.
they$_{nom}$ were alone$_{nom}$
'They were alone.'

b. Było się samemu / *sami.
was$_{impers}$ RM alone$_{dat}$ / alone$_{nom}$
'One was alone.'

This prediction is, however, not confirmed. Both the adjective and the semi-predicate case-agree with the numeral phrase, instead of occurring in the instrumental or dative case (respectively):[98]

(5.255) Pięć kobiet było miłe / ?*miłymi.
five women were nice$_{nom/acc}$ / nice$_{ins}$
'Five women were nice.'

(5.256) Pięć kobiet było same / *samym.
five women were alone$_{nom/acc}$ / alone$_{dat}$
'Five women were alone.'

In conclusion, the position that numeral phrases in examples such as (5.240), (5.245)–(5.251) and (5.255)–(5.256) are adverbials is untenable; a variety of criteria conclusively show that they are true subjects.[99]

Against the Nominative Hypothesis If such numeral phrases must be subjects, then the natural hypothesis is that they are nominative. This position, however, although not as clearly inadequate as the accusative-impersonal hypothesis, considerably (and unnecessarily!) complicates the grammar and, as such, should be rejected.

First of all, nominative subjects always agree with the verb in Polish. Since the verb in the examples above bears the 3rd person singular neuter features, this means that numeral subjects should be in some sense 3rd person singular neuter. In what sense?

Czuba and Przepiórkowski (1995) extensively argue for an analysis of subject–verb agreement in Polish as involving the subject's *index*. If this is right, then numeral subjects should be specified as 3rd singular neuter. This, however, cannot be the case as the following binding examples show:

[98] See §5.4 for an analysis of such predicational constructions.
[99] See also Dziwirek (1990, 1994) for the same conclusion, based on partly overlapping considerations.

(5.257) Pięciu facetów zobaczyło siebie samych w lustrze.
five guys$_{gen}$ saw$_{3rd,sg,neut}$ Self Emph$_{pl,masc}$ in mirror
'Five guys saw themselves in a mirror.'

(5.258) Pięć kobiet zobaczyło siebie same w lustrze.
five women$_{gen}$ saw$_{3rd,sg,neut}$ Self Emph$_{pl,fem}$ in mirror
'Five women saw themselves in a mirror.'

Although the reflexive anaphor *siebie* does not show number or gender distinction, it is not neutralized for these features, as the agreement with the emphatic particle *sam*, which does inflect for gender and number, shows. Thus, *siebie* in (5.257) is plural and masculine, while *siebie* in (5.258) is plural and feminine. But since binding involves co-indexation, the same features must be borne by indices of *pięciu facetów* and *pięć kobiet*, respectively. This contradicts the assumption that numeral subjects have 3rd singular neuter *indices*.[100]

A desperate attempt at answering this objection might be made by saying that, in Polish, subject–verb agreement does not involve the subject's *index*, but rather some other, morphosyntactic features instead. So, the subject would be 3rd person singular neuter in a purely morphosyntactic sense, not reflected by its *index* value. This, however, is refuted by the kind of data considered in Czuba and Przepiórkowski (1995), which show that, whenever morphosyntactic features do not agree with *index* features, the former are responsible for adjective–noun agreement, while the latter for both binding and subject–verb agreement. A relevant example is given below:

(5.259) Jego szacowna wysokość ujrzał siebie samego w lustrze.
his respectable$_{sg,fem}$ highness$_{sg,fem}$ saw$_{3rd,sg,masc}$ Self Emph$_{sg,masc}$ in mirror
'His respectable highness saw himself in the mirror.'

In (5.259), although the head noun of the subject is morphosyntactically feminine, as evidenced by the agreeing feminine adjective, the subject still bears the masculine *index*, as shown by masculine features on the verb and on the reflexive anaphor. This shows that, in Polish, the verb agrees with the subject's *index*, and not with its morphosyntactic features.[101] Thus, on the **nominative** hypothesis, the lack of subject–verb agreement remains a complete mystery.

Another, even more serious problem for this hypothesis comes from considerations of adjectival modifiers of such allegedly nominative numeral phrases:[102,103]

[100] By the same token, these observations refute the analysis of Dziwirek (1990, 1994), which derives the default 3rd person singular neuter features on the verb from the assumption that numeral phrases are not specified for gender and number.

[101] Sentences with the polite / party talk *wy* 'you$_{pl}$' seem to constitute a counterexample to this claim:

(i) Wy jesteście ciężarni, towarzyszko.
you$_{pl,nom}$ are$_{pl}$ pregnant$_{pl,masc}$, comrade$_{sg,fem,voc}$
'You are$_{pl}$ pregnant$_{pl,masc}$, comrade$_{sg,fem}$.'

However, Wechsler (1999) argues (on the basis of similar Serbian data) that, in such cases, the *index* of *wy* 'you' is indeed plural, although it may be used to refer to a non-aggregate entity.

[102] In Polish, determiners such as *te*/*tych* in (5.261) are morphosyntactically adjectives, see Saloni and Świdziński (1985, 1998).

[103] Perhaps surprisingly, the argument presented here was first (to the best of our knowledge) made as late as

(5.260) a. Czekało$_{3rd,sg,neut}$ mnie mordercze pięć dni.
awaited me$_{acc}$ murderous$_{nom/acc}$ five days$_{gen}$
'Five hectic days awaited me.'

b. Czekało$_{3rd,sg,neut}$ mnie morderczych pięć dni.
awaited me$_{acc}$ murderous$_{gen}$ five days$_{gen}$
'Five hectic days awaited me.'

(5.261) a. Znowu przyszło te pięć kobiet.
again came$_{3rd,sg,neut}$ these$_{nom/acc}$ five women$_{gen}$
'These five women came again.'

b. Znowu przyszło tych pięć kobiet.
again came$_{3rd,sg,neut}$ these$_{gen}$ five women$_{gen}$
'These five women came again.'

What these examples, involving non-virile subject numeral phrases, show is that the adjectival modifier may occur either in the genitive case (see the b. examples), or in what may be interpreted as either accusative or nominative case (see the a. examples):

(5.262) a. Czekały mnie mordercze / te dni.
awaited$_{3rd,pl}$ me$_{acc}$ murderous$_{nom}$ / these$_{nom}$ days$_{nom}$
'Hectic / these days awaited me.'

b. Czekałem na mordercze / te dni.
waited$_{1st,sg,masc}$ for murderous$_{acc}$ / these$_{acc}$ days$_{acc}$
'I was waiting for hectic / these days.'

So far, so good: the adjectival modifier may be interpreted, consistently with the **nominative** hypothesis, as genitive when agreeing with the noun and as nominative when agreeing with the numeral. However, if this is so, then the same should hold for virile numeral phrases. This expectation is not fulfilled, though:

(5.263) a. *Oczekiwało$_{3rd,sg,neut}$ mnie groźni pięciu facetów.
awaited me$_{acc}$ dangerous$_{nom}$ five guys$_{gen}$
'Five dangerous guys awaited me.' (intended)

b. Oczekiwało$_{3rd,sg,neut}$ mnie groźnych pięciu facetów.
awaited me$_{acc}$ dangerous$_{gen/acc}$ five guys$_{gen}$
'Five dangerous guys awaited me.'

(5.264) a. *Znowu przyszło ci pięciu facetów.
again came$_{3rd,sg,neut}$ these$_{nom}$ five guys$_{gen}$
'These five guys came again.' (intended)

b. Znowu przyszło tych pięciu facetów.
again came$_{3rd,sg,neut}$ these$_{gen/acc}$ five guys$_{gen}$
'These five guys came again.'

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in Przepiórkowski (1996a, 1997b) (see also Czuba and Przepiórkowski (1995)), although Franks (1995, p.139) (independently) cites similar Upper Sorbian data.

The ungrammaticality of (5.263a)–(5.264a) is blatantly inconsistent with the **nominative** hypothesis and—in our view—should be a sufficient reason to drop it.

In fact, only one of the numerous works arguing for or assuming the nominative hypothesis considers the problematic facts (5.263)–(5.264), namely Kopcińska (1997), and it is interesting to see how the **nominative** hypothesis can deal with them.

Kopcińska (1997, p.51) notes the problem posed by (5.263)–(5.264) and proposes a tentative solution whose main idea is to treat the "formally genitive" forms such as *groźnych* and *tych* in these examples as actually nominative. These 'nominative' forms would be used only with numeral phrases. At the same time, real nominative forms, such as *groźni* and *ci* would be forbidden to combine with numeral phrases.

Appreciating the originality of this analysis, we will settle for a less audacious solution below.

Against the Nominative/Genitive Hypothesis The **nominative/genitive** hypothesis, which assumes that numeral subjects are nominative in non-virile gender and genitive in virile, can easily deal with the adjectival modifiers data in (5.260)–(5.261) vs. (5.263)–(5.264). Since non-virile numeral phrases in (5.260)–(5.261) are nominative, adjectival modifiers may occur either in the nominative case (when agreeing with the numeral), as in (5.260a)–(5.261a), or in the genitive case (when agreeing with the noun), as in (5.260b)–(5.261b). On the other hand, the examples involving virile numeral phrases (5.263a)–(5.264a) are ungrammatical because the numeral there is genitive, so it cannot agree with the nominative adjectival modifier. Instead, the modifier must be genitive, as in (5.263b)–(5.264b), i.e., it agrees either with the genitive numeral, or with the genitive noun.

In spite of this advantage of the **nominative/genitive** hypothesis over the **nominative** hypothesis, we will reject it and prefer the **accusative-subject** hypothesis on the following grounds: 1) whatever the **nominative/genitive** hypothesis gets right, so does the **accusative-subject** hypothesis, 2) the **nominative/genitive** hypothesis shares with the **accusative-subject** solution its only problem, i.e., having to postulate a non-nominative subject, 3) but, additionally, the **nominative/genitive** hypothesis shares with the **nominative** hypothesis the problem of not being able to account in a principled way for the lack of agreement between the nominative (in non-virile gender) numeral subject and the verb, and it introduces an additional complication of relating the case of the numeral to its gender, a clear idiosyncrasy in Polish syntax.

Advantages of the Accusative-Subject Hypothesis It should be clear by now that the only hypothesis which is able to account for the full range of data in a uniform manner is the **accusative-subject** hypothesis, which says that *pięć*-type numerals in subject positions are really accusative.

First, it deals with the adjectival modifiers data as well as the **nominative/genitive** hypothesis, but in a more uniform way: adjectival modifiers may always, in principle, agree with either the noun, in which case they are genitive, or with the numeral, in which case they are accusative. Thus, the nominative/accusative forms *mordercze* and *te* in (5.260a)–(5.261a) are interpreted as accusative, while the genitive/accusative forms *groźnych* and *tych* in (5.263b) and (5.264b) are really ambiguous between the genitive and the accusative. By the same token, (5.263a)–(5.264a) are ungrammatical simply because the unambiguously nominative adjectives do not agree either with accusative numerals, or with genitive nouns.

Moreover, the accusative case value of the numeral subject explains the 3rd person singular neuter features of the verb: in Polish, as in other languages,[104] verbs agree only with *nominative* subjects, otherwise they occur in the default non-agreeing 3rd person singular neuter form.[105]

We will see one more (morphological) argument for this analysis in §5.3.2.3 (see (5.339)–(5.340), p.196).

Apparent Disadvantages of the Accusative-Subject Hypothesis The advantages of the accusative solution are clear: it is the only uniform analysis of numeral phrases in subject positions able to account for the full range of data, including the lack of subject–verb agreement and the form of adjectival modifiers. In fact, both kinds of data directly *follow* from this single assumption.

What are the disadvantages? One potential problem stems from the sole argument for the nominativeness of subject numerals phrases given in Saloni (1976, p.32): they may be coordinated with clearly nominative phrases, as in (5.251), repeated below.

(5.251) Do kina poszło pięciu facetów i ich bracia.
to cinema went$_{3rd,sg,neut}$ five guys$_{gen}$ and their brothers$_{nom}$
'Five guys and their brothers went to the cinema.'

This argument rests on the assumption that only phrases bearing the same case value can be coordinated. This assumption is, however, clearly false. First, as discussed, e.g., in Świdziński (1992b, 1993), it is possible to coordinate a cased nominal phrase with a caseless clause:

(5.265) Jana dziwi, [że Maria wybiera Piotra], i [jej brak gustu].
John$_{acc}$ suprise Comp Mary$_{nom}$ chooses Peter$_{acc}$ and her lack$_{nom}$ good taste$_{gen}$
'John is surprised that Mary chooses Peter and by her lack of good taste.'

Also examples of coordination of two temporal adverbials, one being a cased NP and the other being an adverb or a PP, are readily constructed:

(5.266) Spotkam się z nim wieczorem i jutro / za dwa dni.
meet$_{1st,sg,fut}$ RM with him evening$_{ins}$ and tomorrow$_{adv}$ / in two days
'I will meet him in the evening and tomorrow / in two days.'

(5.267) Obronię się tego lata lub w przyszłym roku.
defend$_{1st,sg,fut}$ RM this$_{gen}$ summer$_{gen}$ or in next year
'I will defend (my thesis) this summer or next year.'

[104] See, e.g., Andrews (1982) and Sag *et al.* (1992) on Icelandic, and Kathol (1998) for a general HPSG analysis.

[105] See Czuba and Przepiórkowski (1995), as well as the data in Dziwirek (1990, 1994), for justification of this generalization for Polish.

Second, also nominal phrases bearing different case values may be coordinated in right circumstances:[106,107]

(5.268) Kto, co i komu dał?
who$_{nom}$ what$_{acc}$ and whom$_{dat}$ gave
'Who gave what to whom?'

(5.269) Dajcie wina i całą świnię!
give wine$_{gen}$ and whole$_{acc}$ pig$_{acc}$
'Serve (some) wine and a whole pig!'

(5.270) Przyjedzie albo późnym wieczorem, albo następnej zimy.
come$_{3rd,sg,fut}$ or late$_{ins}$ evening$_{ins}$ or next$_{gen}$ winter$_{gen}$
'(S)he will come either late in the evening, or next winter.'

So, the fact that a numeral phrase in the subject position can be coordinated with a nominative phrase does not constitute an argument for the nominativeness of this numeral phrase any more than (5.265) shows that the clause bears the nominative case, or (5.268) that *komu* is really as nominative as *kto*.

A more real disadvantage of the **accusative-subject** hypothesis is that it involves an idiosyncratic stipulation that there are accusative subjects in Polish. Although traditional grammarians mention 'logical subjects' in the genitive and the dative cases, the latter extensively discussed by Dziwirek (1994), to the best of our knowledge no claims have been made about the existence of accusative subjects. This is, we believe, the reason why those theories which *define* subjects as nominative phrases cannot accept this solution.

However, where this solution makes one stipulation, other solutions must make at least 3–4 independent stipulations: the **nominative/genitive** hypothesis must stipulate that 1) virile and non-virile numeral phrases have different structures, 2) virile numeral phrases are genitive, 3) non-virile numeral phrases, despite being nominative, do not agree with the verb but require instead the 3rd person singular neuter form of the verb; the **nominative** hypothesis stipulates that 1) nominative numeral phrases, unlike other nominative subjects, do not agree with the verb, 2) there exist nominative adjectival elements which have the superficially genitive form, 3) this nominative-genitive form may be used only in the context of numeral phrases, and 4) the true nominative adjectival forms cannot be used to modify virile nominative numerals. We conclude that the **accusative-subject** hypothesis is to be preferred to other accounts as it leads to a clearly least stipulatory grammar.

5.3.1.2 The Structure of Numeral Phrases

The by-product of the above considerations is the answer to one of the two questions posited at the beginning of this section, i.e., why there is no agreement between the numeral subject

[106] In (5.269), the genitive phrase has the partitive function. Unlike in some other languages, e.g., Finnish and, marginally, Russian, in Polish partitive and genitive do not differ in form.

[107] Another example of coordination of phrases with different case values, but with a less clear acceptability status, can be found in fn.156 on p.219.

and the verb. The answer is very simple: this is because numeral phrases in subject positions are not nominative, and the agreement holds only between verbs and nominative subjects. In this subsection we will deal with the second question, i.e., we will investigate the internal structure of numeral phrases.

Just as in case of the first question, there is no agreed answer to the second question, either in Polish linguistics, or in general Slavic theorizing. There are three basic options:

- the **mixed** hypothesis: where the numeral seems to govern the noun and assign the genitive case (i.e., in the NOM and ACC rows in (5.241)–(5.242)), it is the head, otherwise (in the GEN, DAT, INS and LOC rows) the noun is the head and the numeral is a modifier;
- the **nominal head** hypothesis: the noun is always the head;
- the **numeral head** hypothesis: the numeral is always the head.

The **mixed** hypothesis naturally explains the contrast between the NOM/ACC rows in (5.241)–(5.242), where the numeral does not agree with the noun, and other rows, where the numeral and the head agree. This analysis seems to be implicit in traditional accounts, see e.g. Szober (1928), and it can be found also in Tajsner (1990) (a GB analysis) and in Dziwirek (1990) (an RG analysis).[108] This hypothesis is also sometimes adopted for Russian, which shows similar government/agreement split in numeral phrases, e.g., in traditional Russian linguistics,[109] in Neidle (1988) (an LFG analysis), and in Franks (1995) (a GB analysis), and it is at the heart of Dolbey's (1998) analysis of the analogous behaviour of Finnish numeral phrases (within the Construction Grammar framework).

The **nominal head** hypothesis is, on the other hand, based mainly on semantic intuitions, which suggest that the main element in a numeral phrase is the noun. Within Polish linguistics, this position is taken (without argumentation apart from giving semantic intuitions) by, e.g., Laskowski (1984b,a), Willim (1990), Strutyński (1997), and Bobrowski (1995, 1998). It is also assumed or argued for in Babby (1980b, 1985, 1986, 1987, 1988) and Franks (1986, 1990) for Russian, and in Franks (1995) for Serbo-Croatian and Polish.

Finally, the **numeral head** hypothesis is adopted for Polish mainly by Saloni, Świdziński, and their colleagues (Saloni, 1976, 1977; Gruszczyński and Saloni, 1978; Szpakowicz and Świdziński, 1981, 1990; Saloni and Świdziński, 1985, 1998; Kopcińska, 1990, 1997), as well as in Przepiórkowski (1996a, 1997b). It is also assumed for Russian in Pesetsky (1982) and Bowers (1984), and for Serbo-Croatian in Wechsler and Zlatić (1999).

In this case, we will side with Saloni et al., although the arguments for either position are not as conclusive as in the case of the previous issue.

First, there are no known arguments for different structures of numeral phrases in, say, (5.271) and (5.272):

[108] A similar, but slightly more exotic position is taken by Mieczkowska (1994), who argues that Polish numeral phrases are sometimes headed by the numeral, and at other times they are unheaded (exocentric) constructions. We will ignore this hypothesis below.

[109] See Babby (1986, p.179) and Babby (1987, p.102) for references.

(5.271) Janek wspiera pięć fundacji.
John supports five$_{acc}$ foundations$_{gen}$
'John supports five foundations.'

(5.272) Janek pomaga pięciu fundacjom.
John helps five$_{dat}$ foundations$_{dat}$
'John helps five foundations.'

Both can be extended to bigger phrases the same way, both show the same extraction and left branch violation properties, etc. Thus, if positing two different structures can be avoided, it should be avoided. These Ockhamian considerations provide the main argument against the **mixed** hypothesis.

Limiting our attention to the other, homogeneous possibilities, we will see that the **numeral head** hypothesis leads to a simpler analysis.

Assuming a uniform analysis, there are still four logical possibilitities to take into account: the head is either the noun or the numeral, and, for each of these choices, the other element (numeral and noun, respectively) is either a subcategorized argument, or a modifier.[110] Although any of these analyses can be made to work, we will prefer the analysis which posits that the numeral is the head, while the noun (or, rather, the NP) is an argument.

This analysis is simpler than both head–modifier analyses, as, in order to account for the behaviour in the 'government' NOM and ACC rows, they would require either introducing a new numeral–noun modification scheme, allowing a genitive noun to be modified by an accusative numeral (or an accusative numeral by a genitive noun), or they would complicate modification information contained in particular lexical entries (cf. the MOD feature in HPSG), e.g., accusative numerals would have to be specified as being able to modify genitive nouns, but only in NOM and ACC positions. On the other hand, if the numeral is the head and the noun is an argument, then the idiosyncrasy is confined to lexical entries of the (relatively) closed class of numerals.

This analysis is also slightly simpler than an analysis having the noun as the head and the numeral as an argument, minimally because, if it were the noun that headed numeral phrases, then the case value of the head (genitive) would not agree with the expected head in two positions, NOM and ACC, while on our analysis, such discrepancy arises only in the case of NOM (subject) positions.

Moreover, it is not clear in what sense the numeral would be an argument of the noun: numerals are neither required syntactically by nouns, nor are they expected semantically. On the other hand, the noun does seem to be required by the numeral; constructions such (5.273) sound elliptical.[111]

(5.273) Pięciu przyszło. (elliptical)
five came

[110]In the previous literature only two of these possibilities were ever taken into account: the noun being the head and the numeral being a modifier, and the numeral being the head and the noun being an argument.
[111]This is a fairly weak argument, though, because it would classify as heads also possessive phrases, which we analyse below as specifiers of nouns.

‘Five came.’

This brings us to another argument for the numeral head / nominal argument analysis we have chosen, namely a distributional argument, voiced earlier in, e.g., Saloni (1976, p.32) and Saloni and Świdziński (1985, 1998): in NOM and ACC positions, it is clearly the numeral that distributionally represents the numeral phrase, not the noun; compare (5.273) above to (5.274b).

(5.274) a. Pięciu facetów przyszło.
five guys$_{gen}$ came
‘Five guys came.’

b. *Facetów przyszło.
guys$_{gen}$ came
‘Guys came.’ (intended)

In this way, the elliptical (5.273) is analogous to other head–argument constructions in which only the head is realized; see the b. examples below.

(5.275) a. Janek kopnął Tomka, a Maria go pocałowała.
John$_{nom}$ kicked Tom$_{acc}$ and Mary$_{nom}$ him$_{acc}$ kissed
‘John kicked Tom, and Mary kissed him.’

b. Janek kopnął Tomka, a Maria pocałowała. (elliptical)
John$_{nom}$ kicked Tom$_{acc}$ and Mary$_{nom}$ kissed
‘John kicked Tom, and Mary kissed (him).’

(5.276) a. Janek był tam przed kinem, a Tomek po kinie.
John was there before cinema and tom after cinema
‘John went there before the cinema, and Tom after the cinema.’

b. Janek był tam przed kinem, a Tomek po. (elliptical)
John was there before cinema and tom after
‘John went there before the cinema, and Tom after.’

Thus, this distributional test prefers the numeral head + nominal argument analysis we chose not only to the nominal head analyses, but also to the numeral head + nominal modifier analysis, on which (5.273) should not sound elliptical.

In conclusion, we adopt the analysis of numeral phrases as headed by the numeral and involving a nominal argument.[112]

[112] It should be noted that Babby (1987) explicitly argues against the validity of such a conclusion in Russian, which is similar to Polish in relevant respects. His main arguments come from the comparison of Modern Russian (MR) numeral phrases with Old Russian (OR); he shows that, while in OR, numerals where clearly singular feminine nouns always governing genitive noun phrases, in MR the situation is different. Although, for the sake of brevity, we will not discuss his arguments in detail, we would like to point out that they do not provide evidence against our analysis, but simply show that MR numerals are not the singular feminine nouns they used to be in OR.

5.3.1.3 An HPSG Analysis

In the two subsections above we established that numeral phrases *really* are numeral phrases, i.e., they are headed by the numeral which subcategorizes for an NP, and we also saw that, in positions where ordinary nominal phrases bear the nominative case, numeral phrases are accusative. In this section, we will make these observations more precise and formalize them in HPSG.

NP Arguments of Numerals as Subjects In Przepiórkowski (1996a, 1997b), we analysed numerals as subcategorizing for NP *complements*. This analysis, although observationally and technically adequate, does not meet the main conceptual criticism levelled against the numeral head / nominal complement hypothesis, namely, that heads normally do not case-agree with their complements. For this reason we will modify that account and propose to analyse NPs subcategorized for by numerals as their *subjects*.

Why subjects? Assuming that 1) numerals subcategorize for NPs, as we argued above, that 2) these NPs are not complements, and that 3) numerals are essentially nouns, as we will assume below, there are two options to choose from: either those NPs are subjects or they are specifiers.

It is not completely clear, though, that there really are two options: should specifiers and subjects really be distinguished in the context of nominal phrases? Pollard and Sag (1994, pp.359ff.) make the following distinction between specifiers and subjects:

- specifiers lack the potential to be semantic arguments (with the possible exception of possessives);
- in predicative copular constructions, the (unrealized) subject of the predicate, but not the specifier, is structure-shared with the (realized) subject of the copula, cf. (5.277).

(5.277) The predicative copula *be* (simplified):

$$\begin{bmatrix} \text{PHON} & \text{be} \\ \text{SUBJ} & \langle \boxed{1} \rangle \\ \text{COMPS} & \left\langle \text{XP}\begin{bmatrix} \text{PRD} & + \\ \text{SUBJ} & \langle \boxed{1} \rangle \end{bmatrix} \right\rangle \end{bmatrix}$$

As to the latter property, which they take to be more important, Pollard and Sag (1994, pp.359–360) give examples such as (5.278)–(5.279), where the bracketed items are subjects, and the emphasized elements are specifiers.

(5.278) [John] is *an* idiot.

(5.279) [John] is *six feet* tall.

A similar argument can be constructed for Polish, assuming, as Pollard and Sag (1994, pp.374ff.) do, that possessive phrases must be either subjects or specifiers:[113,114]

[113] See Zlatić (1997b, pp.102ff.) for similar considerations on the basis of Serbo-Croatian.

[114] Note that, in Polish, the NP complement of the copula is normally in the instrumental case.

(5.280) [Ten facet] jest *moim* bratem.
this guy is my brother
'This guy is my brother.'

(5.281) [Ta książka] jest podręcznikiem *Marii.*
this book is textbook Mary_{poss}
'This book is Mary's textbook.'

Since it does make sense to posit the subject/specifier distinction in Polish, the question of the subject/specifier status of NP dependents of numerals is a valid one. Below we will present two arguments constituting at least suggestive evidence that these NP arguments are subjects.

First, we adopt Zlatić's (1997b) analysis of Serbian noun phrases, whose behaviour is similar to Polish NPs in all relevant respects, and assume that universal quantifiers and demonstrative determiners should not be analysed as specifiers, but rather as adjectival modifiers. Thus, although a single NP may contain a universal quantifier, a demonstrative determiner, and a possessive phrase, as in (5.282), the length of the SPR list is at most one; in case of the head noun in (5.282), it contains only the *synsem* of the possessive phrase.

(5.282) te wszystkie twoje książki
these all your books
'all these books of yours'

This means that Polish (and Serbian) seems to comply with the assumption in Pollard and Sag (1994) that the length of SPR can be at most one, just as the length of SUBJ.

If this is so, then the argument for the subjectness of the NP dependent of a numeral comes from the possibility of a numeral occurring simultaneously with an NP argument and with a possessive specifier:

(5.283) moje pięć książek
my_{acc} five_{acc} books_{gen}
'my five books'

Note that, since the possessive phrase case-agrees with the accusative numeral, rather than with the genitive NP *książek*, it should be analysed as the specifier of the numeral *pięć*, and not, for example, the preposed specifier of the noun *książek*.

To summarize the argument, if 1) the length of SPR is at most one, 2) the possessive occupies the SPR list, 3) the NP argument is either the specifier, or the subject of the numeral, then this NP must be the subject of the numeral.

The **second** argument rests on the analysis of predicative copular constructions based on the lexical entry (5.277).[115] If this analysis, commonly assumed in HPSG, is on the right track, than the complement of the copula should be an almost saturated predicative phrase (XP), whose unrealized subject should be structure-shared with the subject of the copula (see $\boxed{1}$

[115] See Kasper (1997) for further details of an HPSG analysis of predicative copula.

in (5.277)). If so, then fully saturated phrases cannot be complements of the copula. Thus, this analysis predicts that, unlike ordinary NPs, numeral phrases cannot be complements of the predicative copula because their subject is realized. Although judgements are not completely clear, this prediction seems to be confirmed:

(5.284) Ci ludzie są świetnymi muzykami.
these people are excellent musicians
'These people are excellent musicians.'

(5.285) ??Ci ludzie są pięcioma świetnymi muzykami.
These people are five excellent musicians
'These people are five excellent musicians.'

Note that the relative unacceptability of (5.285) clearly contrasts with the grammaticality of (5.286):[116]

(5.286) Ci ludzie to pięciu świetnych muzyków.
These people are five excellent musicians
'These people are five excellent musicians.'

The grammaticality difference between (5.285) and (5.286) results from observations in Rothstein (1986) that, contrary to the received wisdom, the two apparent copulae *być* and *to* differ in that the former is used mainly predicatively ('ascriptively'), while the latter is mainly used equationally (it is an identity predicate), although it may also be used as a predicational copula. The relative acceptability of (5.285) results from the fact that, although the copula *być* is used mainly predicationally, it may marginally be used equationally. Thus, the contrast (5.285)–(5.286) is similar to the contrast below, in which only the equational reading makes sense.

(5.287) ??Aleksander Głowacki jest Bolesławem Prusem.
Aleksander Głowacki is Bolesław Prus

(5.288) Aleksander Głowacki to Bolesław Prus.
Aleksander Głowacki is Bolesław Prus

These two arguments license our treatment of numerals as subcategorizing for NP subjects.

Additional evidence for some of the decisions made above comes from considerations of binding facts. As noted in Rozwadowska (1995), binding properties of the possessive phrase depend on its interpretation:

(5.289) a. książka Chomsky'ego$_i$ o sobie$_i$
book Chomsky$_{poss}$ about Self

[116]Unlike in the case of the copula *być*, the complement of *to* is in the nominative case (unless it is an accusative numeral phrase).

'Chomsky's (author) book about himself'

b. *książka Chomsky'ego$_i$ o sobie$_i$
book Chomsky$_{poss}$ about Self
'Chomsky's (owner) book about him' (intended)

Given that in Polish anaphor antecedents are subjects, the data above could be naturally accounted for by saying that the function of the possessive phrase is ambiguous between the specifier and the subject; this could constitute an additional argument for having both attributes on Polish nouns.[117]

If this is right, then, by considerations similar to those involving numeral phrases above, we might expect nominal phrases with author-possessives to be less felicitous as complements of *być* than as complements of *to*. Again, although the judgements are subtle, the expectation seems to be confirmed:

(5.290) ??Ten tom jest książką Chomsky'ego$_i$ o sobie$_i$.
this volume is book Chomsky$_{poss}$ about Self
'This volume is Chomsky's book about himself.'

(5.291) Ten tom to książka Chomsky'ego$_i$ o sobie$_i$.
this volume is book Chomsky$_{poss}$ about Self
'This volume is Chomsky's book about himself.'

Before moving to the analysis proper, let us point out again an important feature of the "NP argument of a numeral as its subject" analysis: This analysis solves the problem of **the mixed agreement/government pattern of numeral phrases**. Although we do not normally expect a complement to agree with the head, we do expect head–subject agreement. In fact, we even expect the heterogeneous agreement/government behaviour.

One precedence we have just seen: the subject–verb (non)agreement. As discussed in §5.3.1.1, apparent subject numeral phrases are real subjects, and yet they fail to agree with the verb (because they occur in the accusative case), and instead they seem to 'govern' 3rd person singular neuter verbs. We have a clear *prima facie* agreement/government pattern here.

Another precedence is possessive subject–nominal head pattern. In Polish, the possessive may either be a full genitive NP, as in (5.289) above, or it may be a personal (or reflexive) possessive pronoun, which case-agrees with the nominal head:[118]

(5.292) a. moja / twoja książka
my$_{nom}$ / your$_{nom}$ book$_{nom}$
'my / your book'

b. moją / twoją książkę
my$_{acc}$ / your$_{acc}$ book$_{acc}$

c. mojej / twojej książki
my$_{gen}$ / your$_{gen}$ book$_{gen}$

[117] But see Marciniak (1999) for a different analysis.

[118] The facts are a little more complex here: only the 1st and 2nd person possessive pronouns clearly case-agree with the head, while 3rd person possessive pronouns do not inflect for case.

Such pronominal possessives can also bind anaphors, i.e., they may also be subjects (apart from being able to act as specifiers):[119]

(5.293) To twoja kolejna książka o sobie!
this $your_{nom}$ $another_{nom}$ $book_{nom}$ about Self
'This is yet another book (written by you) about yourself!'

So, head nouns seem to govern full NP possessives and agree with pronominal possessives.[120]

Finally, another example of a mixed government/agreement relation between the head and its non-complement argument is provided by the pronoun *coś* 'something' and related pronouns *nic* 'nothing', *co* 'what', *co(ś)kolwiek* 'whatever', cf. Świdziński (1992a, §7.4.5.2) and Andrejewicz (1996, §2.1.1.2). These pronouns, but not similar pronouns *ktoś* 'somebody', etc., govern their arguments and assign them the genitive case when they occur in NOM and ACC positions, and agree with them in other positions, e.g.:

(5.294) Coś twojego leży na stole.
$something_{nom}$ $your_{gen}$ lies on table
'There is something of yours on the table.'

(5.295) Widziałem coś nowego.
$saw_{1st,sg,masc}$ $something_{acc}$ new_{gen}
'I saw something new.'

(5.296) Przyglądałem się czemuś miłemu / *miłego.
$looked\text{-}at_{1st,sg,masc}$ RM $something_{dat}$ $nice_{dat}$ / $nice_{gen}$
'I was looking at something nice.'

Although in (5.295)–(5.296) the relevant position is occupied by an adjective, which may suggest that this is a non-argument, such post-pronominal element cannot easily be iterated, unlike a pre-nominal modifier:[121]

[119] That possessives can be subjects is even clearer in case of verbal nouns (see fn.11 on p.108), where the subject argument is realized as a possessive phrase, e.g., (5.39) on p.110.

[120] Since we analyse possessive phrases as able to realize either the subject or the specifier position in an NP, this argument shows that also the specifier–head relation can show the mixed agreement/government pattern.

Polish also exhibits marginally the option of having an adjectival non-pronominal possessive, case-agreeing with the noun, e.g.:

(i) Jasina stodoła
$John_{poss,adj,nom}$ $shed_{nom}$
'John's shed'

If such adjectival possessive were analysed as specifiers/subjects, as done for Serbo-Croatian in Zlatić (1997b), then this strengthens our point that mixed agreement/government is typical of head–subject/specifier relations in Polish.

[121] If examples such as (5.297a)–(5.298a) do not sound completely unacceptable, we believe this is for the same reason that the following sentence is not utterly bad:

(i) ??Janek jest miły, dobry.
John is nice good
'John is nice (and?) good.'

(5.297) a. ??coś miłego twojego
something$_{nom/acc}$ nice$_{gen}$ your$_{gen}$

b. twoje miłe coś
your$_{nom/acc}$ nice$_{nom/acc}$ something$_{nom/acc}$
'your nice something'

(5.298) a. ??coś nowego miłego
something$_{nom/acc}$ new$_{gen}$ nice$_{gen}$

b. nowe miłe coś
new$_{nom/acc}$ nice$_{nom/acc}$ something$_{nom/acc}$
'something nice and new'

The impossibility of iteration, where semantically iteration makes sense, is a characteristic of arguments, not of adjuncts. Moreover, the possibility of the possessive pronoun occurring in this position, cf. (5.294), suggests that this is a specifier or subject position.[122]

Thus, we see that the complex agreement/government pattern between a head and its subject or specifier is the rule rather than the exception in Polish, and the heterogeneous relationship between the numeral head and its nominal subject fits well into this pattern.

A final note on **the consistency of our analysis with the rest of the grammar** is in order: an objection might be raised on the grounds that the NP arguments of the numeral are linearized after the head numeral, just as complements. It is true that complements of nouns are normally realized after the noun, but so are full NP subjects. One example is given in (5.289) above, which shows the post-nominal realization of the subject *Chomsky'ego*. Although the pre-nominal realization is also possible, it is clearly marked. Similarly, the subject of verbal gerunds (which categorially are nouns in the sense that they decline for case) is also normally realized after the head:

(5.299) śpiewanie Marii
sing$_{grnd}$ Mary$_{poss}$
'Mary's singing'

Pronominal subjects are an exception to this rule, see, e.g., (5.292)–(5.293) above. The situation is similar in the case of numeral phrases, where post-numeral pronominal subjects are a marked option:

(5.300) a. nas / was / ich pięciu
us / you / them five
'five of us / you / them'

b. ?pięciu nas / was / ich
five us / you / them
'five of us / you / them'

Thus, we conclude that word order facts do not constitute a problem for our analysis.

[122]The grammaticality of such pronominal phrases as complements of the predicative copula suggests that such arguments are specifiers.

Polish Numerals in HPSG The last issue we should decide on before giving an HPSG analysis of Polish numerals is their **categorial status**. Without much argumentation, we assume that *pięć*-type numerals constitute a subclass of nouns (Gołąb *et al.*, 1968, p.317). One reason for this position is that numeral phrases can occur in the same syntactic positions as numeral-free NPs. On the other hand, numerals have a number of syntactic properties which distinguish them from garden variety nouns, and for this reason we assume that there is a diacritic feature distinguishing numerals from other nouns. We realize this idea by proposing a boolean feature NUMERAL, abbreviated to NUM, appropriate for HEAD values of type *noun*. Thus, e.g., *książka* 'book' and *pięć* 'five' will have the following HEAD values:[123]

(5.301) *książka*: $\left[\text{HEAD} \begin{bmatrix} \textit{noun} \\ \text{NUMERAL} \ - \end{bmatrix}\right]$

(5.302) *pięć*: $\left[\text{HEAD} \begin{bmatrix} \textit{noun} \\ \text{NUMERAL} \ + \end{bmatrix}\right]$

Below, we will make the [NUMERAL +] specification directly responsible for the accusative case in subject positions.

In order to account for the **mixed agreement/government** pattern, illustrated in declension tables (5.241)–(5.242), repeated below, we will posit two basic lexical entries for *pięć*-type numerals, given in (5.303) and (5.304).

(5.241) Non-Virile Declension of *pięć* 'five':

	five	*women*
NOM	pięć$_{acc}$	kobiet$_{gen}$
ACC	pięć$_{acc}$	kobiet$_{gen}$
GEN	pięciu$_{gen}$	kobiet$_{gen}$
DAT	pięciu$_{dat}$	kobietom$_{dat}$
INS	pięciu/pięcioma$_{ins}$	kobietami$_{ins}$
LOC	pięciu$_{loc}$	kobietach$_{loc}$

(5.242) Virile Declension of *pięć* 'five':

	five	*guys*
NOM	pięciu$_{acc}$	factów$_{gen}$
ACC	pięciu$_{acc}$	factów$_{gen}$
GEN	pięciu$_{gen}$	factów$_{gen}$
DAT	pięciu$_{dat}$	facetom$_{dat}$
INS	pięciu/pięcioma$_{ins}$	facetami$_{ins}$
LOC	pięciu$_{loc}$	facetach$_{loc}$

Schematic lexical entries for *pięć*-type numerals:

[123]Another option would be to have two subtypes of *noun*, one for 'true nouns' and one for numerals. To all intents and purposes, the difference between this alternative and the one in the main text is purely aesthetical.

(5.303)
$$\begin{bmatrix} \textit{word} & \\ \textsc{ss}|\textsc{loc}|\textsc{cat} & \begin{bmatrix} \textsc{head} & \begin{bmatrix} \textit{noun} \\ \textsc{case}\ \textit{str} \\ \textsc{num}\ + \end{bmatrix} \\ \textsc{val}|\textsc{subj} & \langle \text{NP}[\textit{lgen}] \rangle \end{bmatrix} \end{bmatrix}$$

(5.304)
$$\begin{bmatrix} \textit{word} & \\ \textsc{ss}|\textsc{loc}|\textsc{cat} & \begin{bmatrix} \textsc{head} & \begin{bmatrix} \textit{noun} \\ \textsc{case}\ \boxed{1}\textit{lex} \\ \textsc{num}\ + \end{bmatrix} \\ \textsc{val}|\textsc{subj} & \langle \text{NP}[\textsc{case}\ \boxed{1}] \rangle \end{bmatrix} \end{bmatrix}$$

According to these schematic entries, numerals will always agree in case with their subjects when they themselves bear a lexical case; otherwise, i.e., when their case is structural, they will subcategorize for genitive subjects.[124]

It is clear how (5.304) reflects the agreement pattern in the DAT, INS and LOC rows; these positions can be occupied only by lexical cases, *ldat*, *lins* and *lloc*, respectively. The situation is slightly more complex in the NOM and ACC rows, which show the government pattern. The numerals in these rows bear the structural case (in fact, the *sacc*), i.e., they instantiate the schematic entry in (5.303). That is, arguments of these numerals are rather idiosyncratically specified as *l*exical *gen*itive.

A more elegant alternative to the schematic entry (5.303) would be (5.305) below:

(5.305)
$$\begin{bmatrix} \textit{word} & \\ \textsc{ss}|\textsc{loc}|\textsc{cat} & \begin{bmatrix} \textsc{head} & \begin{bmatrix} \textit{noun} \\ \textsc{case}\ \textit{str} \\ \textsc{num}\ + \end{bmatrix} \\ \textsc{val}|\textsc{subj} & \langle \text{NP}[\textit{str}] \rangle \end{bmatrix} \end{bmatrix}$$

The genitive case of the subject would be then assigned by a clause of the CASE PRINCIPLE responsible for structural case assignment to arguments of nouns (see §5.1.3).

(5.306)
$$\begin{bmatrix} \textit{category} \\ \textsc{head}\ \textit{noun} \\ \textsc{arg-st}\ \boxed{1}_{\textit{list}} \oplus \langle \text{NP}[\textsc{case}\ \textit{str}] \rangle \oplus \boxed{2}_{\textit{list}} \end{bmatrix} \rightarrow \begin{bmatrix} \textsc{arg-st}\ \boxed{1} \oplus \langle [\textsc{case}\ \textit{sgen}] \rangle \oplus \boxed{2} \end{bmatrix}$$

Now, since numerals are specified as [HEAD *noun*], the clause (5.306) would also apply to them and assign the genitive case to all its structural arguments, including structural subjects.

This solution would be, however, problematic on several grounds. First, (5.306) would have to be modified in order to account for the possibility of a subject/specifier of a noun being realized as a possessive pronoun agreeing in case with the nominal head, see, e.g., the data in (5.292) above. When such an NP, consisting of a pronominal possessive and a head noun,

[124]Our decision to specify the subject of structural numerals as *lexical* genitive is purely arbitrary here. One alternative would be to specify it as *structural* genitive, but then a generalization emerging from previous considerations, namely, that lexical entries never specify particular morphological cases of their structural arguments, would be lost. Another, much more appealing alternative, will be discussed in the main text presently.

occurs in nominative or accusative case, both the head and the possessive pronoun must be analysed as structural. If, however, the principle in (5.306) were valid for Polish, the only structural arguments of a noun would gave to be genitive, contra the actual behaviour of possessive pronouns. Another, more serious, problem with such a more principled account is that it cannot be easily extended to paucal numerals, discussed in §5.3.2.1 below. In brief, there, the NP subject of a numeral head may occur in the nominative or accusative case, contradicting the principle (5.306) again. In conclusion, we retain our analysis based on lexical entries (5.303)–(5.304), and leave a sparser and more elegant analysis for future research.

To summarize our considerations so far, we argued that accusative numerals (in NOM and ACC rows) are described by (5.303), while dative, instrumental and locative numerals (DAT, INS and LOC rows) are described by (5.304). What about the GEN row, though? On our account, genitive case is subdivided into lexical genitive (*lgen*) and structural genitive (*sgen*), i.e., genitive numeral phrases actually instantiate both schematic lexical entries above. This means that, when the numeral phrase is in a structural genitive position, as in (5.307) below, the genitive case of the subject *facetów* is assigned via the lexical entry (5.303), but when it occurs in a lexical case position, as in (5.308), the genitive case results from agreement with the head, as specified in the lexical entry (5.304).

(5.307) Janek nie lubi pięciu facetów.
John$_{nom}$ NM likes five$_{gen}$ guys$_{gen}$
'John doesn't like five guys.'

(5.308) Janek boi się pięciu facetów.
John fears RM five$_{gen}$ guys$_{gen}$
'John is afraid of five guys.'

Thus, according to this analysis, the divide between the government pattern and the agreement pattern runs right through the GEN row in (5.241)–(5.242) above. This distinguishes our account from all other accounts of Slavic numeral phrases, which classify genitive numeral phrases as either always belonging to the agreement pattern, or always belonging to the government pattern.

Note that our analysis assumes that the heterogeneous government/agreement pattern is encoded in the *lexicon*; it is a result of the fact that *pięć*-type numerals must comply with schematic lexical entries (5.303)–(5.304). A cleaner alternative would be to have a general *grammatical* constraint to the effect that all [NUMERAL +] elements must behave as suggested by the schematic lexical entries above. This could be formally implemented by positing general and underspecified lexical entries such as (5.309), and having a constraint as in (5.310):

(5.309)
$$\begin{bmatrix} \textit{word} \\ \text{PHON } F(\boxed{1},\text{pięć}) \\ \text{SS}|\text{LOC}|\text{CAT} \begin{bmatrix} \text{HEAD} \begin{bmatrix} \textit{noun} \\ \text{CASE } \boxed{1} \\ \text{NUM } + \end{bmatrix} \\ \text{VAL}|\text{SUBJ } \langle \text{NP}[\text{CASE } \boxed{2}] \rangle \end{bmatrix} \end{bmatrix}$$

(5.310) If a *word*'s ... NUMERAL has the value '+', then either its case (cf. $\boxed{1}$) is *str*uctural and the case of its SUBJECT (cf. $\boxed{2}$) is *lgen*itive (or perhaps *sgen*itive), or they are both *lex*ical and equal.

Such an elegant analysis, tightly connecting the heterogeneous agreement/government pattern within numeral phrases to the feature [NUM +], would not be extendable to other numerals, discussed in §5.3.2; there are syntactic numerals (in the sense that they project to accusative subjects and combine with 3rd person singular neuter verbs) which, however, depart in various ways from the mixed pattern of *pięć*-type numerals, e.g., collective numerals (cf. (5.328) below), numeralizations (cf. (5.336)), *dużo*-type indefinite numerals (cf. §5.3.2.4), and nonstandard paucal numerals (cf. (5.325)). This considerable variation of subcategorization properties of various classes of numerals strongly favours lexicalist analyses, like ours.

Moving now to the source of the **accusative case marking on numeral subjects**, we have to split the clause (5.205) of the CASE PRINCIPLE responsible for resolving the structural case of the subject to *snom* into two clauses, for numeral and for non-numeral subjects.

(5.205)
$$\begin{bmatrix} \textit{category} \\ \text{HEAD } \textit{verb} \\ \text{ARG-ST } \langle \text{NP}^{-}[\text{CASE } \textit{str}] \rangle \oplus \boxed{1} \end{bmatrix} \rightarrow \begin{bmatrix} \text{ARG-ST } \langle [\text{CASE } \textit{snom}] \rangle \oplus \boxed{1} \end{bmatrix}$$

These two new clauses are given below:

(5.311)
$$\begin{bmatrix} \textit{category} \\ \text{HEAD } \textit{verb} \\ \text{ARG-ST } \langle \text{NP}^{-}\begin{bmatrix} \text{CASE } \textit{str} \\ \text{NUM } - \end{bmatrix} \rangle \oplus \boxed{1} \end{bmatrix} \rightarrow \begin{bmatrix} \text{ARG-ST } \langle [\text{CASE } \textit{snom}] \rangle \oplus \boxed{1} \end{bmatrix}$$

(5.312)
$$\begin{bmatrix} \textit{category} \\ \text{HEAD } \textit{verb} \\ \text{ARG-ST } \langle \text{NP}^{-}\begin{bmatrix} \text{CASE } \textit{str} \\ \text{NUM } + \end{bmatrix} \rangle \oplus \boxed{1} \end{bmatrix} \rightarrow \begin{bmatrix} \text{ARG-ST } \langle [\text{CASE } \textit{sacc}] \rangle \oplus \boxed{1} \end{bmatrix}$$

Finally, in order to account for the **3rd person singular neuter marking on the verb**, whose subject is an accusative numeral phrase, we adopt the VERB AGREEMENT PRINCIPLE given in Czuba and Przepiórkowski (1995) and consisting of two implicational constraints:[125]

(5.313)
$$\begin{bmatrix} \textit{word} \\ \text{SS}|\text{LOC}|\text{CAT} \begin{bmatrix} \text{HEAD}|\text{VFORM } \textit{fin} \\ \text{ARG-ST } \neg(\langle [\text{CASE } \textit{nom}] \rangle \oplus \boxed{0}) \end{bmatrix} \end{bmatrix} \rightarrow$$
$$\begin{bmatrix} \text{SS}|\text{LOC}|\text{CAT}|\text{HEAD}|\text{AGR} \begin{bmatrix} \text{PERSON } \textit{3rd} \\ \text{GENDER } \textit{neut} \\ \text{NUMBER } \textit{sg} \end{bmatrix} \end{bmatrix}$$

(5.314)
$$\begin{bmatrix} \textit{word} \\ \text{SS}|\text{LOC}|\text{CAT} \begin{bmatrix} \text{HEAD}|\text{VFORM } \textit{fin} \\ \text{ARG-ST } \langle [\text{CASE } \textit{nom}] \begin{bmatrix} \text{PERSON } \boxed{1} \\ \text{GENDER } \boxed{2} \\ \text{NUMBER } \boxed{3} \end{bmatrix} \rangle \oplus \boxed{0} \end{bmatrix} \end{bmatrix} \rightarrow$$

[125]The feature AGR encodes agreement properties of an item, here, a finite verb. (See Kathol (1998) and Czuba and Przepiórkowski (1995) for details.) We will ignore this feature elsewhere in this study.

$$\left[\text{SS}|\text{LOC}|\text{CAT}|\text{HEAD}|\text{AGR} \begin{bmatrix} \text{PERSON } \boxed{1} \\ \text{GENDER } \boxed{2} \\ \text{NUMBER } \boxed{3} \end{bmatrix}\right]$$

What this principle says is that, given the first element of a finite verb's ARG-ST is an NP[*nom*] (the nominative subject), the verb agrees with this element in person, gender and number, cf. (5.314). Otherwise, cf. (5.313), the verb is specified as 3rd person singular neuter. See Czuba and Przepiórkowski (1995) for independent evidence for the VERB AGREEMENT PRINCIPLE (5.313)–(5.314).

5.3.1.4 Summary

In this subsection, we examined the behaviour of Polish *pięć*-type numerals in detail. We argued that these numerals are syntactic heads of numeral phrases and that the NPs they combine with are their subjects. We also showed, conclusively, we hope, that, for whatever reason, they bear the accusative case when they occur in the subject position. Finally, we gave an HPSG analysis of the syntax of such numerals, which accounts for:

- the mixed agreement/government pattern between the head numeral and the NP;
- the accusative case marking on numeral phrases in subject positions;
- the 'default' 3rd singular neuter marking on the verb combining with a numeral subject.

Below, we will see how this analysis extends to other types of numeral phrases.

5.3.2 Other Numerals

5.3.2.1 Paucal Numerals

Paucal numerals *dwa* 'two', *trzy* 'three' and *cztery* 'four' behave differently from the *pięć*-type numerals.[126] The declension patterns of the numeral *trzy* 'three' is given in (5.315)–(5.316) below; *cztery* 'four' behaves analogously.

(5.315) Non-Virile Declension of *trzy* 'three':

	three	*women*
NOM	trzy_{nom}	kobiety_{nom}
ACC	trzy_{acc}	kobiety_{acc}
GEN	trzech_{gen}	kobiet_{gen}
DAT	trzem_{dat}	kobietom_{dat}
INS	trzema_{ins}	kobietami_{ins}
LOC	trzech_{loc}	kobietach_{loc}

[126] We will not deal here with the 'numeral' *jeden* 'one', whose numeral status is disputable (Bogusławski, 1966; Gruszczyński and Saloni, 1978).

(5.316) Virile Declension of *trzy* 'three':

	three	*guys*
NOM	trzech$_{acc}$	facetów$_{gen}$
	trzej$_{nom}$	faceci$_{nom}$
ACC	trzech$_{acc}$	facetów$_{gen/acc}$
GEN	trzech$_{gen}$	facetów$_{gen}$
DAT	trzem$_{dat}$	facetom$_{dat}$
INS	trzema$_{ins}$	facetami$_{ins}$
LOC	trzech$_{loc}$	facetach$_{loc}$

The main difference between the non-virile declension of *trzy* 'three' in (5.315) and the corresponding declension pattern for *pięć* 'five', cf. (5.241) above, is that the former does not show the mixed agreement/government characteristics. Instead, only the agreement pattern is possible. Additionally, although the nominative and the accusative forms are morphologically syncretic, the case of the numeral phrase in the NOM row should be analysed as nominative because it agrees with the verb:

(5.317) Trzy kobiety przyszły / *przyszło.
three$_{nom}$ women$_{nom}$ came$_{3rd,pl,fem}$ / came$_{3rd,sg,neut}$
'Three women came.'

An even clearer argument is provided by personal pronouns, which do not show nominative/accusative syncretism:

(5.318) My / *Nas trzy przyszłyśmy.
we$_{nom}$ / us$_{acc/gen}$ three$_{nom}$ came$_{1st,pl,fem}$
'The three of us came.'

This pattern can be easily accounted for assuming that lexical entries for *trzy* 'three' and *cztery* 'four' are not (5.303)–(5.304) above, but rather (5.319), which differs from (5.304) in lacking the specification *lex*ical and in having NUM set to '−'.[127]

(5.319) $\begin{bmatrix} \textit{word} \\ \text{SS|LOC|CAT} \begin{bmatrix} \text{HEAD} \begin{bmatrix} \textit{noun} \\ \text{CASE } \boxed{1} \\ \text{NUM } - \end{bmatrix} \\ \text{VAL|SUBJ } \langle \text{NP[CASE } \boxed{1}] \rangle \end{bmatrix} \end{bmatrix}$

Since NUM is set to '−', numeral phrases headed by such numerals behave just like ordinary NPs with respect to case assignment. In particular, when they occur as first elements of ARG-ST, they are assigned the nominative case by the clause (5.311), rather than the accusative case

[127]This last feature of our analysis should not be controversial; historically, Polish numerals are derived from garden variety (feminine) nouns, which agreed with the verb, i.e., from [NUM −] elements. Thus, this specification on paucal numerals may be a last vestige of this old system. Compare also our considerations of numeralizations in §5.3.2.3.

by (5.312). Further, the uniform agreement pattern is reflected by the token-identity of the numeral's CASE value with the CASE value of its subject.[128] Thus, the schematic lexical entry in (5.319) correctly accounts for the behaviour of non-virile *trzy* 'three' (and *cztery* 'four').

The behaviour of the virile 'three' is a little more complicated as it allows both the agreement and the government patterns in the NOM row. As might be expected, only the phrases exhibiting the agreement pattern agree with the verb:

(5.320) Trzej faceci przyszli / *przyszło.
three$_{nom}$ guys$_{nom}$ came$_{3rd,pl,masc}$ / came$_{3rd,sg,neut}$
'Three guys came.'

(5.321) Trzech facetów przyszło / *przyszli.
three$_{acc}$ guys$_{gen}$ came$_{3rd,sg,neut}$ / came$_{3rd,pl,masc}$
'Three guys came.'

In this respect, virile numerals of the *trzy*-type seem to fall in between non-virile *trzy*-numerals, and *pięć*-numerals discussed in §5.3.1: just like *pięć*-type numerals, they have the schematic lexical entry (5.303), repeated below, but they also have the fully agreeing lexical entry (5.319), which they share with the non-virile *trzy*-type numerals.

(5.303)
$$\begin{bmatrix} \textit{word} & \\ \textsc{ss}|\textsc{loc}|\textsc{cat} & \begin{bmatrix} \textsc{head} & \begin{bmatrix} \textit{noun} \\ \textsc{case}\ \textit{str} \\ \textsc{num}\ + \end{bmatrix} \\ \textsc{val}|\textsc{subj} & \langle \text{NP}[\textit{lgen}] \rangle \end{bmatrix} \end{bmatrix}$$

Thus, the numeral in (5.320) is described by (5.319), while the numeral in (5.321) conforms to (5.303). Since the former is specified as [NUM −], it receives the nominative case via the clause (5.311) of the CASE PRINCIPLE and agrees with the verb via the clause (5.314) of the VERB AGREEMENT PRINCIPLE. The latter, on the other hand, since it is specified as [NUM +], receives the accusative case via (5.312), and triggers the 3rd person singular neuter features on the verb via (5.313).

Note that this analysis predicts that in the ACC row of (5.316), the NP *facetów* is either in the accusative case (when the numeral realizes the full agreeing pattern (5.319)) or in the genitive case (when it adheres to (5.303)). Because of the syncretism of accusative and genitive nouns and adjectives in virile plural, we see no way of confirming or refuting this prediction.

This analysis carries over to the case of *dwa* 'two', which differs from *trzy* 'three' and *cztery* 'four' only in having its non-virile declension pattern split into two morphologically separate patterns, one for feminine nouns, the other for neuter and non-human masculine nouns (the difference can be seen in the NOM, ACC and INS rows):

(5.322) Feminine Declension of *dwa* 'two':

[128] Note that, when a numeral described by (5.319) occurs in the subject position, it and its argument bear the structural nominative case. It is facts like these that were alluded to when rejecting an analysis of *pięć*-type numerals based on (5.305)–(5.306) above (p.186).

	two	*women*
NOM	dwie_{nom}	kobiety_{nom}
ACC	dwie_{acc}	kobiety_{acc}
GEN	dwu/dwóch_{gen}	kobiet_{gen}
DAT	dwu/dwóm_{dat}	kobietom_{dat}
INS	$\text{dwiema/dwoma}_{ins}$	kobietami_{ins}
LOC	dwu/dwóch_{loc}	kobietach_{loc}

(5.323) Neuter and Masculine Non-Virile Declension of *dwa* 'two':

	two	*windows*	*tables*	*dogs*
NOM	dwa_{nom}	okna_{nom}	stoły_{nom}	psy_{nom}
ACC	dwa_{acc}	okna_{acc}	stoły_{acc}	psy_{acc}
GEN	dwu/dwóch_{gen}	okien_{gen}	stołów_{gen}	psów_{gen}
DAT	dwu/dwóm_{dat}	oknom_{dat}	stołom_{dat}	psom_{dat}
INS	dwoma_{ins}	oknami_{ins}	stołami_{ins}	psami_{ins}
LOC	dwu/dwóch_{loc}	oknach_{loc}	stołach_{loc}	psach_{loc}

(5.324) Virile Declension of *dwa* 'two':

	two	*guys*
NOM	dwu/dwóch_{acc}	facetów_{gen}
	dwaj_{nom}	faceci_{nom}
ACC	dwu/dwóch_{acc}	$\text{facetów}_{gen/acc}$
GEN	dwu/dwóch_{gen}	facetów_{gen}
DAT	dwu/dwóm_{dat}	facetom_{dat}
INS	dwoma_{ins}	facetami_{ins}
LOC	dwu/dwóch_{loc}	facetach_{loc}

Before we move to collective numerals, a final note is in order. Since numerals *pięć* 'five' and higher behave more coherently than the paucal numerals, which show differences in behaviour depending on gender, we might expect paucal numerals to show a tendency to assimilate to higher numerals. This tendency does, indeed, exist in Polish, and it is reported in the normative publication Buttler *et al.* (1971, pp.340–350), which cites the following examples, not sanctioned by the norm (i.e., marked as %):[129]

(5.325) %Cztery tygodnie minęło.
$\text{four}_{nom/acc}$ $\text{weeks}_{nom/acc}$ $\text{passed}_{3rd,sg,neut}$
'Four weeks passed.'

(5.326) %trzy bułek
$\text{three}_{nom/acc}$ rolls_{gen}

Another, attested[130] example similar to (5.325) is given below:

[129] Uses such as (5.325) were noted as early as by Szober (1928, p.105).

[130] It was uttered by the newscaster of the third channel of Polish public radio (so-called *Trójka*) on 2nd August 1999 and it is accepted by native speakers as correct.

(5.327) %Trzy minuty pozostało do godziny siedemnastej.
three$_{nom/acc}$ minutes$_{nom/acc}$ remained$_{3rd,sg,neut}$ to hour seventeen
'It's three minutes to 5pm.'

In fact, Buttler *et al.* (1971, p.350) advise not to ban uses such as (5.325) and (5.327).

What is interesting about cases like (5.325) and (5.327) is that they confirm one aspect of our analysis, namely, the independence of the genitive marking on the subject of a structural numeral, specified directly in lexical entries (see *lgen* in (5.303)) from the non-agreement between the numeral subject and the verb; the latter is triggered by the accusative marking on numeral phrase, which in turn is triggered by the [NUM +] specification on the numeral. In (5.325), although the NP *tygodnie* agrees with the numeral and, in this sense, adheres to the paucal pattern (5.319), it is apparently specified as [NUM +] (as evidenced by the non-agreement with the verb, which is probably the result of the accusative nature of the numeral phrase, which is triggered by the [NUM +] specification), in accordance with the *pięć*-type pattern (5.303). Thus, our analysis allows us to elegantly account for such partial attempts at assimilating paucal numerals to *pięć*-type numerals made by native speakers of Polish.[131]

However, in view of the fact that most popular normative publications stigmatize constructions such as (5.325)–(5.327) (Markowski, 1999, p.1674), it remains to be seen whether paucal numerals will ever be fully assimilated to *pięć*-type numerals.

5.3.2.2 Collective Numerals

Collective numerals (Polish: *liczebniki zbiorowe*) are used with noun phrases describing people of mixed sex (e.g., *pięcioro studentów*, 'five students (of mixed sex)'), children (*czworo dzieci*, 'four children'), small animals (*troje kurcząt*, 'three chickens'), and with some *plurale tantum* nouns (*pięcioro drzwi*, 'five doors'). Their behaviour further motivates our decision to give an analysis of Polish numeral phrases based on the lexical properties of numerals, rather than on some general features of Polish (morpho-)syntax.

(5.328) Declension of *pięcioro* 'five':[132]

	five	*children*
NOM	pięcioro$_{acc}$	dzieci$_{gen}$
ACC	pięcioro$_{acc}$	dzieci$_{gen}$
GEN	pięciorga$_{gen}$	dzieci$_{gen}$
DAT	pięciorgu$_{dat}$	dzieciom$_{dat}$
INS	pięciorgiem$_{ins}$	dzieci$_{gen}$
LOC	pięciorgu$_{loc}$	dzieciach$_{loc}$

Note that this declension pattern differs only minimally from the declension pattern of *pięć*-type numerals in (5.241) above. The only difference is in the INS row: where the instrumental

[131] Another aspect of this assimilation is that government patterns such as (5.321) above are used more often than full agreement patterns such as (5.320).

[132] We mark the numeral in the NOM row as accusative by analogy to our analysis of *pięć*-type numerals; some of the arguments presented there carry over to collective numerals.

of *pięć* case-agreed with its NP argument, the instrumental of *pięcioro* governs the genitive case. This is a clear idiosyncrasy, and it is treated as such; we assume that collective numerals have schematic lexical entries (5.329)–(5.330):

$$(5.329)\quad \left[\begin{array}{ll} \multicolumn{2}{l}{\textit{word}} \\ \textsc{ss}|\textsc{loc}|\textsc{cat} & \left[\begin{array}{ll} \textsc{head} & \left[\begin{array}{l} \textit{noun} \\ \textsc{case}\ \textit{str} \vee \textit{lins} \\ \textsc{num}\ + \end{array}\right] \\ \textsc{val}|\textsc{subj} & \langle \mathrm{NP}[\textit{lgen}] \rangle \end{array}\right] \end{array}\right]$$

$$(5.330)\quad \left[\begin{array}{ll} \multicolumn{2}{l}{\textit{word}} \\ \textsc{ss}|\textsc{loc}|\textsc{cat} & \left[\begin{array}{ll} \textsc{head} & \left[\begin{array}{l} \textit{noun} \\ \textsc{case}\ \boxed{1}(\textit{lex} \wedge \neg \textit{lins}) \\ \textsc{num}\ + \end{array}\right] \\ \textsc{val}|\textsc{subj} & \langle \mathrm{NP}[\textsc{case}\ \boxed{1}] \rangle \end{array}\right] \end{array}\right]$$

Other parts of our analysis of *pięć*-type numerals carry over to collective numerals.

It is interesting to note that the pattern (5.329) seems to replace the pattern (5.330) also in the locative case; Buttler *et al.* (1971, p.345) cite following examples:

(5.331) w dwojgu rękach / rąk
in two$_{loc}$ hands$_{loc}$ / hands$_{gen}$
'in both hands'

(5.332) o trojgu dzieciach / dzieci
about three$_{loc}$ children$_{loc}$ / children$_{gen}$
'about three children'

In terms of our analysis, it seems that the lexical scheme (5.329) above is being generalized to (5.333) below, at the cost of (5.330) above.

$$(5.333)\quad \left[\begin{array}{ll} \multicolumn{2}{l}{\textit{word}} \\ \textsc{ss}|\textsc{loc}|\textsc{cat} & \left[\begin{array}{ll} \textsc{head} & \left[\begin{array}{l} \textit{noun} \\ \textsc{num}\ + \end{array}\right] \\ \textsc{val}|\textsc{subj} & \langle \mathrm{NP}[\textit{lgen}] \rangle \end{array}\right] \end{array}\right]$$

In the next subsection, we will see more numerals described by (5.333).

5.3.2.3 Numeralizations

By numeralization we will understand a process consisting in a non-numeral noun becoming a numeral, or a result of such a process. Historically, all numerals considered above are results of numeralization; they used to be feminine nouns always governing a genitive argument (Szober, 1928; Łoś, 1928; Klemensiewicz, 1930, 1985). Interestingly, this process is still alive in contemporary Polish.[133] In fact, there is a whole range of nouns which are becoming numerals before our very eyes.

[133] Actually, the process of numeralization of *pięć*-type numerals lasted until late XIXth century, cf. Klemensiewicz (1985, pp.618, 627).

In case of *tysiąc* 'thousand', *milion* 'million', *miliard* 'billion', etc., this process is very advanced. Although they may still function as singular masculine nouns agreeing with the verb, cf. (5.334), they more readily behave as numerals, i.e., they combine with plural accusative/genitive adjectival modifiers and with 3rd neuter singular verb, cf. (5.335):

(5.334) ?Ten tysiąc osób już przyszedł.
this$_{sg,masc,nom}$ thousand$_{nom}$ people$_{gen}$ already came$_{3rd,sg,masc}$
'The thousand people already came.' (noun)

(5.335) Te / Tych tysiąc osób już przyszło.
these$_{pl,acc}$ / these$_{pl,gen}$ thousand$_{acc}$ people$_{gen}$ already came$_{3rd,sg,neut}$
'The thousand people already came.' (numeral)

On the other hand, numerals like *tysiąc*, etc., retained their nominal property of always combining with a genitive argument:

(5.336) Declension of *tysiąc* 'thousand:

	thousand	*children*
NOM	tysiąc$_{?nom/?acc}$	dzieci$_{gen}$
ACC	tysiąc$_{acc}$	dzieci$_{gen}$
GEN	tysiąca$_{gen}$	dzieci$_{gen}$
DAT	tysiącu$_{dat}$	dzieci$_{gen}$
INS	tysiącem$_{ins}$	dzieci$_{gen}$
LOC	tysiącu$_{loc}$	dzieci$_{gen}$

In terms of our analysis, numeralization is a particularly simple process; it consists mainly in changing the value of NUM from '−' to '+'. *Tysiąc* with [NUM −] is, syntactically, a garden variety noun, i.e., it is assigned the nominative case in the subject position via the revised CASE PRINCIPLE as described above and it agrees with the verb courtesy of the VERB AGREEMENT PRINCIPLE. *Tysiąc* with [NUM +], on the other hand, is syntactically a numeral, i.e., it is assigned the accusative case in the subject position, and this, in turn, triggers the 'default' morphosyntactic features on the verb. Thus, *tysiąc*-type elements in their numeral incarnations will be described by (5.333), repeated below:

(5.333)
$$\begin{bmatrix} \textit{word} \\ \textsc{ss}|\textsc{loc}|\textsc{cat} \begin{bmatrix} \textsc{head} \begin{bmatrix} \textit{noun} \\ \textsc{num}\ + \end{bmatrix} \\ \textsc{val}|\textsc{subj}\ \langle \mathrm{NP}[\mathit{lgen}] \rangle \end{bmatrix} \end{bmatrix}$$

It is interesting to note that the single noun *tysiąc* gives rise to two numerals: *tysiąc* and *tysiące*, the latter syncretic with the plural form of the noun *tysiąc*. However, contrary to what one might think, *tysiące* qua numeral cannot be said to be a plural form of the numeral *tysiąc*; they are both plural, compare (5.335) above to (5.338) below.

(5.337) Te / ?*tych tysiące osób już przyszły.
these$_{pl,nom}$ / these$_{pl,gen}$ thousands$_{nom}$ people$_{gen}$ already came$_{3rd,pl}$
'These thousands of people already came.' (noun)

(5.338) Te / ?Tych tysiące osób już przyszło.
these$_{pl,acc}$ / these$_{pl,gen}$ thousands$_{acc}$ people$_{gen}$ already came$_{3rd,sg,neut}$
'These thousands of people already came.' (numeral)

Thus, both *tysiąc* in (5.335) and *tysiące* in (5.338) are numerals, both satisfying the description (5.333) above, but the latter belonging to the semantic class of indefinite numerals, cf. §5.3.2.4.

Other nouns which became to various extent numeralized are, e.g., *tuzin* 'dozen', *mnóstwo* 'lots of', *szereg* 'array', *masa* 'mass', *część* 'part', *moc* 'power', *odrobina* 'trifle, wee bit', *większość* 'majority', *procent* 'percent', *kawałek* 'piece, *garstka* 'handful', see, e.g., Schabowska (1962), Buttler *et al.* (1971, pp.340–351), Gruszczyński and Saloni (1978, p.22), Markowski (1999, pp.1675–1678). Some of them, e.g., *kawałek* and *garstka* are acceptable in their numeral use only to some speakers, other, like *szereg* and *masa* are relatively well-established. In fact, numeralizations such as *szereg* and *tysiąc* seem to gradually move away from the government pattern and adopt the mixed agreement/government pattern typical for numerals, see Buttler *et al.* (1971, p.347).

What is important for our considerations, though, is that, when the nominative form of a numeralized noun differs from its accusative form, it is usually the accusative form that appears as the numeral in the subject position, e.g.:[134]

(5.339) Masa ludzi przyszła / ?*przyszło.
mass$_{3rd,sg,fem,nom}$ people$_{gen}$ came$_{3rd,sg,fem}$ / came$_{3rd,sg,neut}$
'Mass of people came.'

(5.340) Masę ludzi przyszło / *przyszła.
mass$_{acc}$ people$_{gen}$ came$_{3rd,sg,neut}$ / came$_{3rd,sg,fem}$
'Mass of people came.'

As extensively discussed by Schabowska (1970) (and earlier noted by Szober (1928, p.101)), similar processes worked in the past; e.g., what is now a frozen indefinite numeral *trochę* 'a little', used to be the accusative form of the feminine noun, *trocha*.

These facts strongly support our analysis of Polish numerals in subject positions as bearing the accusative case.

5.3.2.4 Indefinite Numerals

By indefinite numerals, we mean here those lexemes which denote a certain imprecise quantity and which pattern with other numerals in triggering the 3rd person singular neuter morphosyntactic features on the verb when they occur in the subject position. These lexemes can be subdivided into four subclasses:

[134] This is also noted by Schenker (1964, 1971).

CLASS 1 Indefinite numerals which parallel *pięć*-type numerals: they have the heterogeneous agreement/government relationship with their subjects and they combine with 3rd singular neuter verbs (when they are in subject positions). This class includes, e.g., *wiele* 'many', *kilka* 'several', *ile* 'how many', *ileś* 'some quantity', *tyle* 'that many', *parę* 'a couple', etc. Our considerations of *pięć*-type numerals in §5.3.1 directly carry over to this class of numerals.

CLASS 2 Collective indefinite numerals such as *kilkoro* and *kilkudziesięcioro*; our analysis in §5.3.2.2 carries over to this class.

CLASS 3 Indefinite numerals which behave like *tysiąc*, *milion*, etc., i.e., which normally combine with a genitive NP. The properties of numerals belonging to this class were discussed (and examples given) in §5.3.2.3 above.

CLASS 4 Indefinite numerals with a restricted paradigm, e.g., *dużo* 'a lot', *mało* 'little', *trochę* 'a little', *sporo* 'quite a lot', etc. We will deal with this class below.

As noted in §5.1.4.1, the exact distribution of *dużo*-type (i.e., CLASS 4) indefinite numerals has so far resisted precise description. Some works, e.g., Doroszewski (1980) describe these forms as allowed to occur only in nominative and accusative positions, others, e.g., as Saloni and Świdziński (1985, 1998) add that they also occur in ad-verbal genitive positions. The confusion is so great that both generalizations appear in two places in a single normative publication; compare the entry for *dużo* in Markowski (1999, p.177) with the entry for LICZEBNIKI NIEOKREŚLONE ('indefinite numerals') in Markowski (1999, p.1677).

In §5.1.4.1 we reached a simple generalization concerning the distribution of *dużo*-phrases: they may occur in any (non-ad-nominal) structural position. Leaving aside the non-ad-nominal position constraint, this distribution is particularly easy to account for in our analysis; *dużo*-type phrases differ from *pięć*-type phrases mainly in having only the structural case entry (5.303), and not the lexical case entry (5.304), both repeated below:

An entry describing *dużo*:

(5.303)
$$\begin{bmatrix} \textit{word} \\ \text{SS}\mid\text{LOC}\mid\text{CAT} \begin{bmatrix} \text{HEAD} \begin{bmatrix} \textit{noun} \\ \text{CASE } \textit{str} \\ \text{NUM } + \end{bmatrix} \\ \text{VAL}\mid\text{SUBJ } \langle \text{NP}[\textit{lgen}] \rangle \end{bmatrix} \end{bmatrix}$$

An entry *not* describing *dużo*:

(5.304)
$$\begin{bmatrix} \textit{word} \\ \text{SS}\mid\text{LOC}\mid\text{CAT} \begin{bmatrix} \text{HEAD} \begin{bmatrix} \textit{noun} \\ \text{CASE } \boxed{1}\textit{lex} \\ \text{NUM } + \end{bmatrix} \\ \text{VAL}\mid\text{SUBJ } \langle \text{NP}[\text{CASE } \boxed{1}] \rangle \end{bmatrix} \end{bmatrix}$$

Since *dużo*-type numerals may bear only the structural case, as discussed in §5.1.4.1, they may occur in any nominative and accusative positions, as well as in *some* genitive positions. Moreover, as predicted by (5.303), they always combine with a genitive NP, and they trigger the 'default' morphosyntactic features on the verb, just as other numerals do:

(5.341) Dużo osób przyszło.
many people$_{gen}$ came$_{3rd,sg,neut}$
'Many people came.'

(5.342) (Nie) lubię dużo osób.
NM like$_{1st,sg}$ many people$_{gen}$
'I (don't) like many people.'

We view the ease with which we have accounted for the difference between *pięć*-type numerals and *dużo*-type numerals as directly supporting our analysis of both types of numerals.

Before concluding this subsection, a brief note is in order. The analysis just presented assumes that it is merely a lexical idiosyncrasy that the CLASS 4 indefinite numerals show such a restricted distribution. This account might be rejected on the basis that it is 'unprincipled' in the sense that it does not try to relate the distribution of *dużo*-type numerals to their other most conspicuous property, i.e., the fact that they do not visibly decline (i.e., have a 'frozen' morphological form). However, if such a relation exists, it must be at best partial: there is at least one numeral which, just like CLASS 4 numerals does not visibly decline, but which, nevertheless, belongs to CLASS 1 in being able to occur both in structural and in lexical positions, and in displaying the mixed government/agreement pattern. This numeral is *około* 'about', which—to the best of our knowledge—has not been recognized as a numeral previously. It is illustrated below.

(5.343) Około siedmiu osób przyszło. (nominative position)
about seven$_{gen}$ people$_{gen}$ cam$_{3rd,sg,neut}$
'Some seven people came.'

(5.344) Widzę około siedmiu osób. (accusative)
see$_{1st,sg}$ about seven$_{gen}$ people$_{gen}$
'I see about seven people.'

(5.345) Bałem się około siedmiu osób. (lexical genitive)
fear$_{1st,sg,masc}$ RM about seven$_{gen}$ people$_{gen}$
'I was afraid of some seven people.'

(5.346) Dałem to około siedmiu osobom. (dative)
gave$_{1st,sg,masc}$ this about seven$_{dat}$ people$_{dat}$
'I gave this to about seven people.'

(5.347) Rozmawiałem z około siedmioma osobami. (instrumental)
talked$_{1st,sg,masc}$ with about seven$_{ins}$ people$_{ins}$
'I talked to some seven people.'

(5.348) Rozmawiałem o około siedmiu osobach. (locative)
talked$_{1st,sg,masc}$ about about seven$_{loc}$ people$_{loc}$
'I talked about some seven people.'

The evidence that *około* is, indeed, a syntactic numeral, i.e., that it does bear the [NUM +] specification, comes from the fact that it has all the characteristics common to the numerals considered so far (with the exception of paucal numerals): when in subject position, it bears a plural index, as shown by the binding example (5.349), but it nevertheless triggers the 3rd person singular neuter morphosyntactic features on the verb. Moreover, phrases headed by *około* are (marginally) modifiable by either an accusative or a genitive adjective, cf. (5.350).

(5.349)	Około	pięciu	kobiet	zobaczyło	same	siebie	w	lustrze.
	about	five$_{gen}$	women$_{gen}$	saw$_{3rd,sg,neut}$	Emph$_{pl,fem}$	Self	in	mirror.

‘Some five women saw themselves in the mirror.’

(5.350)	a.	?Czekało$_{3rd,sg,neut}$	mnie	mordercze	około	pięciu	dni.
		awaited	me$_{acc}$	murderous$_{acc}$	about	five$_{gen}$	days$_{gen}$

‘About five hectic days awaited me.’

	b.	?Czekało$_{3rd,sg,neut}$	mnie	morderczych	około	pięciu	dni.
		awaited	me$_{acc}$	murderous$_{gen}$	about	five$_{gen}$	days$_{gen}$

‘About five hectic days awaited me.’

The contrast between *dużo* and *około*, both morphologically ‘frozen’, but only the latter being able to occur in lexical case positions, shows that the distribution of numerals cannot be straightforwardly related to their morphological properties and it further supports our lexicalist analysis.[135]

5.3.2.5 Other Semantic Numerals

In this very brief subsection we will only mention other kinds of lexemes which semantically belong to the class of numerals, but do not show any of the interesting syntactic characteristics of numerals discussed above and are best analysed as adjectives, always agreeing in case with their heads.[136]

Ordinal Numerals This class (Polish: *liczebniki porządkowe*) comprises numerals such as *pierwszy* ‘first’, *drugi* ‘second’, etc.

Multiplicational Numerals This class (Polish: *liczebniki mnożne*) includes *podwójny* ‘double’, *potrójny* ‘triple, threefold’, etc.

[135] But see Babby (1985) for a different analysis of the similar behaviour of Russian *okolo*.

[136] Recall that we do not deal here with complex numerals, such as *tysiąc sto dwadzieścia pięć* ‘1125’, see Gruszczyński and Saloni (1978) and Rutkowski (1999) for two different analyses, Gruszczyński (1986) for a survey showing that the syntax of complex numerals is very unstable in contemporary Polish, and Smith (1999) for an HPSG analysis of complex numerals in English, nor do we consider here fractional numerals such as *trzy piąte* ‘three fifths’, and also *pół* ‘half’, etc., which seem to show the [NUM +/−] instability similar to that of numeralizations, cf. Gruszczyński and Saloni (1978, p.39) and Markowski (1999, p.1677).

Manifold Numerals This class (Polish: *liczebniki wielorakie*)[137] is semantically similar to the previous one and it includes *dwojaki* 'twofold', *trojaki* 'threefold', etc.

All these numerals receive their case via the ordinary adjective–noun case agreement.

5.3.3 Summary of Numeral Phrases

Descriptively, the main result of this section is showing that Polish *pięć*-type numerals in subject positions bear the accusative case. We have collected and refined the arguments for this controversial stance already present in the literature, as well as adducing new arguments for this analysis and against other competing analyses. The explanatory force of this position is considerable, as it predicts the otherwise quirky modification facts, the non-agreement with the verb, and the overtly accusative case of new numeralizations such as *masę*. We also argued that this analysis is least stipulatory of all analyses considered in the literature.

We also adopted the hypothesis that numeral phrases are headed by the numeral. We further argued that the nominal argument of a numeral should be analysed as the subject or the specifier of the numeral because elements occupying these positions usually enter a mixed agreement/government pattern with the head. We adduced some evidence that this nominal argument is actually the subject.

Then we presented a lexicalist HPSG analysis of these facts, proposing a new boolean head feature (appropriate for *noun*), NUMERAL, whose '+' value defines numerals as a syntactic class and distinguishes them from other nouns. It is this feature that is directly responsible for the accusative case assignment in the subject position and, indirectly, for the 3rd person neuter singular morphosyntactic values of the verb.

We extended this analysis to other types of numerals, i.e., to paucal numerals, to collective numerals, to new numeralizations, and to *dużo*-type indefinite numerals and we argued that the triviality of this extension, consisting in minor modifications of lexical entries, strongly supports our lexicalist analysis and may be difficult to account for by a more general / principled / syntactically-oriented analysis.

In the course of these considerations, we slightly modified the CASE PRINCIPLE, splitting the clause responsible for nominative case assignment into two clauses. The full current version of this principle is summarized below.

CASE PRINCIPLE FOR POLISH (third version):

(5.311) $$\begin{bmatrix} \textit{category} \\ \text{HEAD } \textit{verb} \\ \text{ARG-ST } \langle \text{NP}^{-}\begin{bmatrix} \text{CASE } \textit{str} \\ \text{NUM } - \end{bmatrix} \rangle \oplus \boxed{1} \end{bmatrix} \rightarrow \begin{bmatrix} \text{ARG-ST } \langle [\text{CASE } \textit{snom}] \rangle \oplus \boxed{1} \end{bmatrix}$$

(5.312) $$\begin{bmatrix} \textit{category} \\ \text{HEAD } \textit{verb} \\ \text{ARG-ST } \langle \text{NP}^{-}\begin{bmatrix} \text{CASE } \textit{str} \\ \text{NUM } + \end{bmatrix} \rangle \oplus \boxed{1} \end{bmatrix} \rightarrow \begin{bmatrix} \text{ARG-ST } \langle [\text{CASE } \textit{sacc}] \rangle \oplus \boxed{1} \end{bmatrix}$$

[137] The English translations of *liczebniki mnożne* and *liczebniki wielorakie* are ours.

(5.206) $$\begin{bmatrix} \textit{category} \\ \textsc{head}\ \begin{bmatrix} \textit{verb} \\ \textsc{neg}\ - \end{bmatrix} \\ \textsc{arg-st}\ \boxed{1}_{\textit{nelist}} \oplus \langle \mathrm{NP}^{-}[\textsc{case}\ \textit{str}] \rangle \oplus \boxed{2}_{\textit{list}} \end{bmatrix} \rightarrow \left[\ \textsc{arg-st}\ \boxed{1} \oplus \langle [\textsc{case}\ \textit{sacc}] \rangle \oplus \boxed{2}\ \right]$$

(5.207) $$\begin{bmatrix} \textit{category} \\ \textsc{head}\ \begin{bmatrix} \textit{verb} \\ \textsc{neg}\ + \end{bmatrix} \\ \textsc{arg-st}\ \boxed{1}_{\textit{nelist}} \oplus \langle \mathrm{NP}^{-}[\textsc{case}\ \textit{str}] \rangle \oplus \boxed{2}_{\textit{list}} \end{bmatrix} \rightarrow \left[\ \textsc{arg-st}\ \boxed{1} \oplus \langle [\textsc{case}\ \textit{sgen}] \rangle \oplus \boxed{2}\ \right]$$

(5.208) $$\begin{bmatrix} \textit{category} \\ \textsc{head}\ \textit{prep} \\ \textsc{arg-st}\ \langle \mathrm{NP}^{-}[\textsc{case}\ \textit{str}] \rangle \end{bmatrix} \rightarrow \left[\ \textsc{arg-st}\ \langle [\textsc{case}\ \textit{sacc}] \rangle\ \right]$$

In the next section, devoted to case assignment to predicative APs (and, by extension, NPs), we will provide (in §5.4.3) an analysis of a phenomenon repeatedly invoked above, namely, the freedom of a modifier of an accusative numeral phrase to occur either in the accusative or in the genitive case.

5.4 Case Assignment and Predication

Unlike in case of Genitive of Negation and Numeral Phrases, there is hardly any theoretical literature on case patterns in predicative constructions in Polish,[138] and whatever analyses there are are fragmentary and often based on incorrect empirical generalizations.

Below, we will first look into predication patterns in simple clauses (§5.4.1), then we will examine the interaction of predication and control (§5.4.2), and, finally, we will deal with predication of numeral phrases (§5.4.3). Throughout, we will be concerned mainly with adjectival predicative phrases, but we believe that the extension to nominal predicates is trivial (see also §5.1.5 above).

5.4.1 Case (Non-)Agreement and Predication

5.4.1.1 Basic Generalizations

The basic generalization found in contemporary generative literature[139] is that, in Polish, predicative adjectives must agree with the predicated elements. This is illustrated in (5.351)–(5.353), which involve subcategorized predicative adjectives, and in (5.354)–(5.357), where the predicative adjectives are apparently not subcategorized.

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[138] The most important *descriptive* work on nominal and adjectival predicates is Pisarkowa (1965). A more recent contrastive study is Czapiga (1994), but it does not go far beyond the kind of data and generalizations considered in Pisarkowa (1965). A relevant article is also Bailyn and Citko (1999), which came to our attention after completing this Chapter and, hence, will not be extensively discussed here (but see fn.140 on p.202 and fn.144 on p.206). Moreover, Grzegorczykowa (1999) gives numerous examples of verbs subcategorizing for predicative complements.

[139] See, e.g., Franks (1995, pp.276ff.).

(5.351) Ona jest miła.
she$_{nom}$ is nice$_{nom}$
'She is nice.'

(5.352) Maria okazała się przyjacielska.
Mary$_{nom}$ turned out RM friendly$_{nom}$
'Mary turned out to be friendly.'

(5.353) Janek zrobił się okropny.
John$_{nom}$ made RM terrible$_{nom}$
'John became terrible.'

(5.354) Widziałem go trzeźwy.
saw$_{1st,sg,masc}$ him$_{acc}$ sober$_{nom}$
'I saw him (when I was) sober.'

(5.355) Widziałem go trzeźwego.
saw$_{1st,sg,masc}$ him$_{acc}$ sober$_{acc}$
'I saw him (when he was) sober.'

(5.356) Nienawidziłem jej pijanej.
hated$_{1st,sg,masc}$ her$_{gen}$ drunk$_{gen}$
'I hated her drunk.'

(5.357) Pomagałem Marii trzeźwej.
helped$_{1st,sg,masc}$ Mary$_{dat}$ sober$_{dat}$
'I helped Mary (when she was) sober.'

However, there is also another, although much more restricted option, of the predicate occurring in the instrumental case:[140]

(5.358) Pamiętam go miłym / miłego.
remember$_{1st,sg}$ him$_{acc}$ nice$_{ins}$ / nice$_{acc}$
'I remember him as nice.'

(5.359) Znam go takim / takiego od dawna. (Czapiga, 1994, p.91)
know$_{1st,sg}$ him$_{acc}$ such$_{ins}$ / such$_{acc}$ since long
'I've known him like that for a long time.'

(5.360) Wyobrażam go sobie pijanego / pijanym.
imagine$_{1st,sg}$ him$_{acc}$ Self$_{dat}$ drunk$_{acc}$ / drunk$_{ins}$
'I imagine him drunk.'

[140] The examples below, as well as many other examples of instrumental predicative APs adduced in this section, directly refute the claim in Bailyn and Citko (1999) that in Polish predicative APs are never instrumental.

(5.361) Zastałem go pijanego / pijanym.
found$_{1st,sg,masc}$ him$_{acc}$ drunk$_{acc}$ / drunk$_{ins}$
'I found him drunk.'

(5.362) Widzę / rodzę / budzę go smutnego / smutnym. (Pisarkowa,
see$_{1st,sg}$ / give birth$_{1st,sg}$ / wake up$_{1st,sg}$ him$_{acc}$ sad$_{acc}$ / sad$_{ins}$
1965, p.21)
'I see him / give birth to him / wake him up sad.'

(5.363) Lubiłem Janka trzeźwego / ?trzeźwym.
liked$_{1st,sg,masc}$ John$_{acc}$ sober$_{acc}$ / sober$_{ins}$
'I liked John (when he was) sober.'

(5.364) Nienawidziłem go pijanego / ?pijanym.
hated$_{1st,sg,masc}$ him$_{gen}$ drunk$_{gen}$ / drunk$_{ins}$
'I hated him (when he was) drunk.'

(5.365) Wydawał się całkiem miły / ??miłym.
seemed$_{3rd,sg,masc}$ RM quite nice$_{nom}$ / nice$_{ins}$
'He seemed quite nice.'

(5.366) Wyszedłem bogaty / ???bogatym, wróciłem biedny / ???biednym.
left$_{1st,sg,masc}$ rich$_{nom}$ / rich$_{ins}$ returned poor$_{nom}$ / poor.
'I left rich and returned poor.'

(5.367) Zjadł kurczaka posolonego / ?*posolonym.
ate$_{3rd,sg,masc}$ chicken$_{acc}$ salted$_{acc}$ / salted$_{ins}$
'He at the chicken salted.'

(5.368) Uderzyłem go nietrzeźwy / ?*nietrzeźwym.
hit$_{1st,sg,masc}$ him$_{acc}$ drunk$_{nom}$ / drunk$_{ins}$
'I hit him (when I was) drunk.'

(5.369) Uderzyłem go nietrzeźwego / ?*nietrzeźwym.
hit$_{1st,sg,masc}$ him$_{acc}$ drunk$_{acc}$ / drunk$_{ins}$
'I hit him (when he was) drunk.'

(5.370) Bałem się go wściekłego / ?*wściekłym.
feared$_{1st,sg,masc}$ RM him$_{gen}$ mad$_{gen}$ / mad$_{ins}$
'I was afraid of him (when he was) mad.'

(5.371) Janowi zimno choremu / *chorym.
John$_{dat}$ cold ill$_{dat}$ / ill$_{ins}$
'John is cold (because he is) ill.'

(5.372) Pomagałem mu choremu / *chorym.
helped$_{1st,sg,masc}$ him$_{dat}$ ill$_{dat}$ / ill$_{ins}$
'I helped him (when he was) ill.'

As these examples show, only some arguments of some verbs can be predicated of by an instrumental adjective.

The fact that, also in Russian, instrumental predicates are possible only with some verbs led Neidle (1982) to the claim that, whenever an instrumental secondary predicative adjective is possible, it is actually a subcategorized argument of the verb.[141] In view of the data above, this solution is problematic because it would predict that either the instrumental is fully acceptable (when it is subcategorized for), or it is completely unacceptable (otherwise). As the data above show, this is not the case: sentences with instrumental predicative adjectives show various degrees of (un)acceptability, from (5.358)–(5.359), where the instrumental adjective sounds slightly better than the agreeing adjective, through (5.360)–(5.362), where the instrumental is fully acceptable, although perhaps slightly worse than the agreeing form, to a little or much less acceptable (5.363)–(5.366) and unacceptable (5.367)–(5.372). Moreover, as noted by, e.g., Czapiga (1994), the felicity of the instrumental depends on such factors as register (it sounds better in high or literary style) and whether the adjectival element is a garden variety adjective, an adjectival pronoun, or an adjectival participle.

To our mind, varying degrees of grammaticality as shown in (5.358)–(5.372) are usually of semantic or pragmatic, rather than syntactic nature. It is thus plausible, that there are some semantic or pragmatic assumptions attached to the instrumental variant of the predicative adjective, which may be more or less compatible with the semantics of the verb or the rest of the sentence. Unfortunately, trying to uncover these semantic/pragmatic properties of instrumental secondary predicates is outside the scope of this syntactically-oriented Chapter.

Another problem with Neidle's (1982) approach stems from the fact that instrumental predicative adjectives become fully acceptable when they predicate of an unrealized subject; in fact, instrumental is the only option then, see the b–c examples below.

(5.373) a. Janek jest miły / ?*miłym.
John$_{nom}$ is nice$_{nom}$ / nice$_{ins}$
'John is nice.'

b. Bycie *miły / miłym ma sens.
being nice$_{nom}$ / nice$_{ins}$ has sense
'Being nice makes sense.'

c. Być *miły / miłym to być *głupi / głupim.
be$_{inf}$ nice$_{nom}$ / nice$_{ins}$ is be$_{inf}$ stupid$_{nom}$ / stupid$_{ins}$
'To be nice is to be stupid.'

(5.374) a. Janek wrócił pijany / ???pijanym.
John$_{nom}$ returned drunk$_{nom}$ / drunk$_{ins}$
'John came back drunk.'

b. Wrócenie *pijany / ?pijanym to głupota.
returning drunk$_{nom}$ / drunk$_{ins}$ is stupidity
'Coming back drunk is a stupidity.'

c. Wrócić *pijany / pijanym to dyshonor.
return$_{inf}$ drunk$_{nom}$ / drunk$_{ins}$ is dishonour

[141] Similar intuition with respect to Polish is expressed in Czapiga (1994, p.93).

'To come back drunk is a dishonour.'

The problem that such data, having their direct counterparts in Russian, pose for Neidle (1982) is that the instrumental in the b–c examples would have to be analysed as unrelated to the instrumental on complement-like secondary predicates in, e.g., (5.358)–(5.364) above. The latter data are taken care of by the rule that says, roughly, that *complement* secondary predicates are instrumental (Neidle, 1982, p.401), but it is not clear what the analysis of the former kind of data should be: since in, e.g., (5.374b–c), the instrumental is acceptable, it should be analysed as an argument of the verb *wrócić* 'return', and it should be equally acceptable as an argument of the finite form in (5.374a), which it is not.

A related problem for the approach of Neidle (1982) is that, if subcategorized predicative adjectives occur in the instrumental case, why is the argument of the predicative copula normally in the nominative case (see (5.373a))?

In summary, we believe that there are good reasons to reject the position that instrumental predicative adjectives are complements of a few selected verbs.[142] In contrast, we claim that the syntax allows the predicate to either agree in case with the predicated element (in the sense to be made precise), or occur in the instrumental case, with other (probably semantic and/or pragmatic) factors, not dealt with here, limiting the occurrence of the instrumental case.

5.4.1.2 Case Agreement and Case Assignment

Predication: A Problem for the CASE PRINCIPLE? Are the case agreement data considered above in conflict with our analysis of case assignment formalized as the CASE PRINCIPLE FOR POLISH on p.200? Not yet, because the CASE PRINCIPLE constrains the CASE values of Noun Phrases, while, in this Chapter, we deal mainly with Adjective Phrases (APs).

Nevertheless, the conflict does exist. First, predicative NPs behave in a way parallel (in respects relevant here) to the behaviour of predicative APs; see the data in §5.1.5. Second, it is relatively clear that the CASE PRINCIPLE should be generalized from $NP^{-}[str]$s to any $XP^{-}[str]$s, i.e., it should apply also to APs. One argument comes from the verb *udawać* 'pretend' which may take an accusative AP.[143] As the examples below show, this AP undergoes the Genitive of Negation and the Genitive of Nominalization, i.e., it is subject to our CASE PRINCIPLE:

(5.375) Maria udaje szczerą.
Mary$_{nom}$ pretends sincere$_{acc}$

[142]See Bailyn (1995) for an analysis of secondary predication in Russian which is consistent with this conclusion. The main predictive difference between that analysis, which is claimed to be valid also for Polish (Bailyn, 1995, p.340), and the analysis developed below is that Bailyn (1995) predicts that in the case of a predicative instrumental attaching to a transitive verb, it will predicate of the accusative object, and not of the nominative subject. Although this seems to be a valid *tendency*, it does not seem to be absolute, cf. Bailyn (1995, p.339), examples (34) and, especially, (i) in fn.14. However, should this tendency be modelled in the syntax, our analysis below can be easily modified to the effect that an instrumental predicate may predicate of not just any structural NP on an ARG-ST, but of the last such NP.

[143]This is the only such verb listed in Świdziński (1994).

'Mary pretends to be sincere.'

(5.376) Maria nie udaje szczerej / *szczerą.
Mary$_{nom}$ NM pretends sincere$_{gen}$ / sincere$_{acc}$
'Mary doesn't pretend to be sincere.'

(5.377) udawanie szczerej
pretend$_{grnd}$ sincere$_{gen}$
'pretending to be sincere'

Another, perhaps weaker, argument comes from the fact that the ad-prepositional accusative, assigned by the clause (5.208) of the CASE PRINCIPLE, is assigned also to APs, e.g.:

(5.378) Uważałem go za szczerego.
considered him$_{acc}$ for sincere$_{acc}$
'I considered him to be sincere.'

(5.379) Janek wyglądał na szczerego.
John$_{nom}$ looked as sincere$_{acc}$
'John seemed to be sincere.'

Note that in neither of these examples is the adjectival accusative case the result of agreement; this is clear in case of (5.379), where the predicated element (*Janek*) is in the nominative case, and it is shown below for (5.378); in (5.380), although the case of the predicated object changes to the genitive, the case of the predicative adjective remains accusative.[144]

(5.380) Nie uważałem jej za szczerą / *szczerej.
NM considered her$_{gen}$ for sincere$_{acc}$ / sincere$_{gen}$
'I didn't consider her to be sincere.'

Given that the CASE PRINCIPLE should be extended to AP arguments (or, indeed, dependents, as we argue below), sentences such as (5.351)–(5.353), repeated below, should be ungrammatical: according to the clause (5.206) of the CASE PRINCIPLE, the predicative APs, which are structural as evidenced by the fact that they bear nominative case (which, in Polish, seems to be always structural), should occur in the accusative case, instead of the agreeing nominative.

(5.351) Ona jest miła.
she$_{nom}$ is nice$_{nom}$
'She is nice.'

(5.352) Maria okazała się przyjacielska.
Mary$_{nom}$ turned out RM friendly$_{nom}$
'Mary turned out to be friendly.'

[144] Such GoN facts are overlooked by Bailyn and Citko (1999), who claim that the accusative on *szczerego* in (5.378) is the result of case agreement with *go*.

(5.353) Janek zrobił się okropny.
John$_{nom}$ made RM terrible$_{nom}$
'John became terrible.'

Evidently, we need to exclude such agreeing predicative elements from the domain of the CASE PRINCIPLE.[145] The obvious option would be to say that it is exactly predicative ([PRD +], in terms of HPSG) elements that are exempt, i.e., case is assigned only to *str*uctural [PRD −] elements. However, this cannot be right because some predicative adjectives do, in fact, receive their case via the CASE PRINCIPLE; (5.375)–(5.379) are relevant examples.

Solution of the Assignment/Agreement Clash The solution to this problem is interesting because it provides an additional argument for the essential correctness of our approach to case assignment developed in Chapter 4, and especially of the analysis in §4.5, based on improvements by Meurers (1999b). We claim that the CASE PRINCIPLE should resolve the case of not just $\mathrm{XP}^{-}[\textsc{case}\ \textit{str}]$ elements, but of $\mathrm{XP}^{-}\begin{bmatrix}\textsc{case} & \textit{str}\\ \textsc{subj} & \mathrm{list}(\mathrm{YP}^{-})\end{bmatrix}$. In other words, structural case is assigned to those elements of ARG-ST a) which are not raised to a higher ARG-ST (as before), and b) whose subject is not raised either. Although this technical description is perhaps not trivial, the intuition behind it is rather simple: assign structural case only to case-bearing 'Complete Functional Complexes'. From now on, we will abbreviate such elements to CFC[*str*], i.e.:

$$\text{(5.381)}\quad \mathrm{CFC} \stackrel{\mathrm{df}}{=} \begin{bmatrix}\textit{arg} & \\ \textsc{arg} & \mathrm{XP}\begin{bmatrix}\textsc{subj} & \mathrm{list}\left(\begin{bmatrix}\textit{arg} & \\ \textsc{arg} & \mathrm{YP}\\ \textsc{raised} & -\end{bmatrix}\right)\end{bmatrix}\\ \textsc{raised} & -\end{bmatrix}$$

The fourth, appropriately modified, version of our CASE PRINCIPLE is given below.

CASE PRINCIPLE FOR POLISH (fourth version):

$$\text{(5.382)}\quad \begin{bmatrix}\textit{category} & \\ \textsc{head} & \textit{verb}\\ \textsc{arg-st} & \left\langle \mathrm{CFC}\begin{bmatrix}\textsc{case} & \textit{str}\\ \textsc{num} & -\end{bmatrix}\right\rangle \oplus \boxed{1}\end{bmatrix} \rightarrow \begin{bmatrix}\textsc{arg-st} & \langle[\textsc{case}\ \textit{snom}]\rangle \oplus \boxed{1}\end{bmatrix}$$

$$\text{(5.383)}\quad \begin{bmatrix}\textit{category} & \\ \textsc{head} & \textit{verb}\\ \textsc{arg-st} & \left\langle \mathrm{CFC}\begin{bmatrix}\textsc{case} & \textit{str}\\ \textsc{num} & +\end{bmatrix}\right\rangle \oplus \boxed{1}\end{bmatrix} \rightarrow \begin{bmatrix}\textsc{arg-st} & \langle[\textsc{case}\ \textit{sacc}]\rangle \oplus \boxed{1}\end{bmatrix}$$

$$\text{(5.384)}\quad \begin{bmatrix}\textit{category} & \\ \textsc{head} & \begin{bmatrix}\textit{verb}\\ \textsc{neg} & -\end{bmatrix}\\ \textsc{arg-st} & \boxed{1}_{\textit{nelist}} \oplus \langle \mathrm{CFC}[\textsc{case}\ \textit{str}]\rangle \oplus \boxed{2}_{\textit{list}}\end{bmatrix} \rightarrow \begin{bmatrix}\textsc{arg-st} & \boxed{1} \oplus \langle[\textsc{case}\ \textit{sacc}]\rangle \oplus \boxed{2}\end{bmatrix}$$

[145] It is often explicitly noted in the literature that case of predicative NPs/APs is determined by a separate set of principles, e.g., Yip *et al.* (1987, §8), Leko (1989, §3.3), and Bratt (1990, p.11). (On the other hand, this is not *exactly* the generalization that we will reach here.)

(5.385) $$\begin{bmatrix} \textit{category} \\ \textsc{head} \begin{bmatrix} \textit{verb} \\ \textsc{neg} + \end{bmatrix} \\ \textsc{arg-st}\ \boxed{1}_{nelist} \oplus \langle \text{CFC}[\textsc{case}\ \textit{str}] \rangle \oplus \boxed{2}_{list} \end{bmatrix} \rightarrow \begin{bmatrix} \textsc{arg-st}\ \boxed{1} \oplus \langle [\textsc{case}\ \textit{sgen}] \rangle \oplus \boxed{2} \end{bmatrix}$$

(5.386) $$\begin{bmatrix} \textit{category} \\ \textsc{head}\ \textit{prep} \\ \textsc{arg-st}\ \langle \text{CFC}[\textsc{case}\ \textit{str}] \rangle \end{bmatrix} \rightarrow \begin{bmatrix} \textsc{arg-st}\ \langle [\textsc{case}\ \textit{sacc}] \rangle \end{bmatrix}$$

Let us now see how this new CASE PRINCIPLE picks up only the non-agreeing predicative phrases.

Note first that in the vast majority of cases, including all cases considered in §§5.2–5.3, the structural XPs have empty SUBJ. Such XPs can be described as CFC[*str*] or as $\text{XP}^{-}[\textit{str}]$, i.e., for them, the new CASE PRINCIPLE makes the same predictions as the previous version. Where the two versions differ is only in case assignment to structural XPs with non-empty SUBJ. It seems that, in Polish, only (and all!) those NPs and APs which are predicative have a non-empty SUBJ list; its element must be identified with the predicated phrase. This means that, in order to investigate differences between the two versions of the CASE PRINCIPLE, we can limit our attention to predicative case-bearing phrases.

Second, our new case assignment principle does not apply to the predicative adjectives in examples (5.351)–(5.353) above. This is because the relevant verbs, i.e., *być* 'be', *okazać się* 'turn out' and *zrobić się* 'become' are semantically raising verbs, which is syntactically reflected by the fact that (the ARG value of) the first element on their ARG-ST is structure-shared with (the ARG value of) the member of the SUBJ list of the second element of this ARG-ST:

(5.387) *być*, *okazać się*, *zrobić się*:
$$\begin{bmatrix} \textsc{arg-st}\ \langle \text{XP}_1[\textsc{arg}\ \boxed{1}],\ \text{XP}_2[\textsc{subj}\ \langle \boxed{0}[\textsc{arg}\ \boxed{1}] \rangle] \rangle \end{bmatrix}$$

This, in turn, means that the subject of the second element of such an ARG-ST list (i.e., $\boxed{0}$ above), must be marked as [RAISED +] according to the principle (4.40) on p.94.[146] If so, then the second argument is not a CFC, and the CASE PRINCIPLE does not apply to it.

Third, the new version of the CASE PRINCIPLE does, on the other hand, apply to the predicative argument of *udawać* 'pretend', as illustrated in (5.375)–(5.377) above. This is because *udawać* is not a raising verb, so its subject only controls the subject of the predicative complement, without the full structure-sharing taking place. Accordingly, the PRO subject of the predicative adjective is marked as [RAISED −], so the predicative AP is a CFC, i.e., it is subject to the CASE PRINCIPLE. We will have more to say about PRO, raising and control in §5.4.1.4 and §5.4.2.[147]

Where our analysis is most surprisingly right is in case of prepositional phrases involving a predicative AP, e.g., (5.378)–(5.379), repeated below.[148]

[146]The actual reasoning is slightly longer.

[147]In particular, in §5.4.2, we will deal with an apparent counterexample to the analysis above, i.e., the verb *czuć się* 'feel', which, although not a raising verb, takes an agreeing predicative AP, instead of the expected accusative, as in case of *udawać*.

[148]Other verbs which subcategorize for a PP involving a predicative AP are *podawać (się) + za* 'introduce (oneself) as', *uchodzić + za* 'be regarded as', *wykształcić (się) + na* 'educate oneself for', *brać + za* 'take

(5.378) Uważałem$_{1st,sg,masc}$ go za szczerego.
considered him$_{acc}$ for sincere$_{acc}$
'I considered him to be sincere.'

(5.379) Janek wyglądał na szczerego.
John$_{nom}$ looked as sincere$_{acc}$
'John seemed to be sincere.'

These verbs seem to be prototypical raising verbs; in fact, *uważać + za* 'consider' and *uznać + za* 'regard as' (cf. fn.148) are taken by Tajsner (1990, p.176) to be *the* two raising to object verbs in Polish. If so, it would seem that the subjects of the predicative APs will be marked as [RAISED +], i.e., that the predicative APs will not be CFCs, i.e., that they will be exempt from the CASE PRINCIPLE and should get their case via agreement with the predicated element, contrary to facts (see (5.380) and the text above it).

Interestingly, the principle responsible for the RAISING marking, i.e., (4.40) (on p.94), whose natural language version is repeated below, will mark the subject of the predicative AP *not* as [RAISED +], as we might simplistically expect, but as [RAISED −].

(4.41) In an unembedded sign (i.e., corresponding to an utterance),
for each *category* object in this sign with [HEAD $\boxed{1}$] and [ARG-ST $\boxed{2}$],
for each element [ARG $\boxed{4}$] on $\boxed{2}$,
this element is [RAISED +] iff
there is an ARG-ST containing an element with the same
[ARG $\boxed{4}$] and containing also an element with the [HEAD $\boxed{1}$].

Note that, according to this principle (and informally speaking), an argument $\boxed{4}$ of a head's ARG-ST is marked as [RAISED +] iff this head projects to a phrase, which is present on an ARG-ST which contains also (another occurrence of) $\boxed{4}$. This, however, is not what is happening in examples (5.378)–(5.379).

To see what is happening, let us consider schematic representations of ARG-STs of the verb, the preposition, and the adjective in (5.378).

(5.388) *szczerego*: [ARG-ST ⟨$\boxed{1}$NP⟩]

(5.389) *za*: [ARG-ST ⟨AP⟩]

(5.390) *uważałem*: [ARG-ST ⟨NP, $\boxed{1}$NP, PP[*za*]⟩]

The predicative adjective *szczerego* has one argument, i.e., its subject. The predicative AP headed by this adjective is subcategorized for by the preposition *za*, which in turn heads a PP which is an argument of the verb. What is important is that there is no ARG-ST which contains both a projection of the predicative adjective and the argument of this adjective, although the former is present on the ARG-ST of the preposition and the latter is present on the ARG-ST of

for', *mieć + za* 'take (lit.: have) for', *obrócić się + na* 'turn out for', *uznać + za* 'take for' (Pisarkowa, 1965; Węgrzynek, 1994; Świdziński, 1994).

the main verb. Thus, perhaps surprisingly, although the subject of the AP predicate is raised to the verb's object position, it 'jumps over' the intermediate ARG-ST and, hence, is marked as [RAISED −], which, in turn, makes the AP subject to the CASE PRINCIPLE.

Of course, the correctness of this analysis rests on the correctness of ARG-STs (5.388)–(5.390), and in particular on the assumption that the subject of the adjective does not appear on ARG-ST of the preposition *za*. Since this analysis will have important consequences for the grammar, we will examine it in more detail in the next paragraph.

P + Predicative Complement ≠ Predicative PP There are three *prima facie* plausible alternatives to the analysis of P + a predicative AP constructions (such as (5.378)–(5.379)) sketched above. We will first consider (and reject) them in turn, and then we will make our analysis more precise.

The first and fairly obvious alternative would be to say that the subject of the predicative adjective raises to the ARG-ST of the verb via the ARG-ST of the preposition. Thus, the ARG-ST of the preposition would be not (5.389), but rather (5.391) below:

(5.391) *za*: $\left[\ \text{ARG-ST}\ \langle \boxed{1}\text{NP},\ \text{AP}[\text{SUBJ}\ \langle \boxed{1} \rangle] \rangle\ \right]$ (tentative)

Moreover, the first argument of this ARG-ST would have to be the SUBJect, unlike the second argument, the AP, which is a COMPlement; otherwise we would expect both arguments to be realized locally to the preposition. The only prepositions which are analysed as having subjects, though, are predicative prepositions such as locative and temporal prepositions, so, in effect, the preposition *za* would have to be analysed as a predicative preposition which takes a predicative complement and raises its subject. This analysis, however, must be rejected for at least two reasons. First, such alleged predicative PPs would be expected to be able to appear as complements of the predicative copula, just as other predicative XPs; this prediction is false:[149]

(5.392) *Janek jest na/za szczerego.
John$_{nom}$ is as/for sincere$_{acc}$
'John is sincere.' (intended)

Second, as extensively discussed in Wechsler (1997), in English, arguments of predicative prepositions have different binding properties than arguments of 'case marking' semantically empty prepositions. The same seems to be true for Polish, cf.:

[149] There are contexts, though, which do allow a PP[*za*] complement of the copula, for example:

(i) W wojsku byłem za kucharza.
in army was$_{1st,sg,masc}$ for cook
'When in army, I was a cook.'

(ii) ?Na balu maskowym byłem za durnia.
on ball mask was$_{1st,sg,masc}$ as fool
'At the fancy dress ball, I was (dressed as) a fool.'

Such cases are very limited, sometimes only marginal and the meaning is idiomatic. Moreover, the PP[*na*] cannot be a complement of the copula even in such idiomatic contexts. We are grateful to Alexandr Rosen and Karel Oliva for pointing out cases like (i)–(ii) to us.

(5.393) Nie można przecież położyć książki$_i$ na sobie$_{?i}$ samej / na niej$_{??i}$ samej.
NM may but lay book$_{fem}$ on Self Emph$_{fem}$ / on her Emph
'But it is impossible to lay a book on itself.'

(5.394) Mówiłem jej$_i$ o sobie$_{*i}$ / o niej$_i$ samej.
talk$_{1st,sg,masc}$ her about Self / about her Emph
'I talked to her about herself.'

Although the judgments in (5.393) are not very clear, the contrast between binding across a predicative preposition (5.393) and across a 'case marking' preposition (5.394) is clear: since in Polish only subjects can be binders, binding by the object in (5.394) is impossible, while binding by the object (5.393) is acceptable, but only because it controls the subject of the predicative preposition.

Now, the preposition *za* in (5.378) clearly patterns with the 'case marking' prepositions, such as *o* in (5.394), and not with predicative prepositions such as *na* in (5.393).

(5.395) (Nie pomyliłem się,) uważałem go$_i$ za siebie$_{*i}$ / za niego$_i$ samego.
I didn't make a mistake, considered$_{1st,sg,masc}$ him$_{acc}$ for himself / for him Emph
'(I didn't make a mistake,) I really considered him for himself.'

These are sufficient reasons to reject the analysis of *za* in (5.378) as raising the subject of its predicative complement to its own subject position.

The second alternative is to treat the apparent preposition in (5.378) as actually a marker. The possibility of treating 'case marking' prepositions as markers, on par with complementizers, is briefly mentioned in Pollard and Sag (1987, p.65), and it is developed for Catalan in Badia (1998). However, this alternative must be rejected for one of the reasons given to reject the previous one: if the apparent preposition is actually a marker, then the whole apparent PP is actually a predicative AP with an unrealized SUBJ. Such an AP should be able to act as a complement of the predicative copula, contrary to facts, cf. (5.392). Another context, in which a predicative XP and its subject may be uttered is the exclamation of surprise, as below:

(5.396) Janek szczery! Też pomysł!
John$_{nom}$ sincere$_{nom}$ also idea
'John (being) sincere! What an idea!'

(5.397) Wałęsa prezydentem! Oszalałeś!
Wałęsa$_{nom}$ president$_{ins}$ become mad$_{3rd,sg,masc}$
'Wałęsa as the president! You must be mad!'

(5.398) Krokodyl w klatce! Też pomysł!
crocodile$_{nom}$ in cage
'A crocodile in a cage! What an idea!'

(5.399) Obiad o dziesiątej! Zwariowałeś!
dinner$_{nom}$ at 10 become crazy$_{3rd,sg,masc}$
'Dinner at 10! You must be crazy!'

Again, the *za* / *na* + predicative AP construction cannot appear in such contexts:

(5.400) *Janek na/za szczerego! Też pomysł!
John$_{nom}$ as/for sincere$_{acc}$ also idea
'John (being) sincere! What an idea.' (intended)

This strengthens our conclusion that, although the AP complement of the preposition *za* is predicative, the whole PP[*za*] is not. This speaks against both alternatives considered so far.

The third alternative would be that the PP[*za*] is a thematic predicate without being a syntactic predicate. This distinction was introduced in Wechsler (1997),[150] who argues that some prepositions which have an empty SUBJ list and, hence, are not syntactic predicates, are, in a sense, semantic predicates in that their CONTENT is lexically specified for a semantic role which is not linked to any ARG-ST element. This 'external' role is assigned via structure-sharing of the CONTENT of the PP with that of the main verb. A relevant example is the 'material' *with*, as in:

(5.401) John loaded the truck with hay.

The CONTENT and ARG-ST of this preposition, as specified in the lexicon, are:

(5.402)
$$\left[\begin{array}{ll} \textit{word} & \\ \text{PHON} & \text{with} \\ \text{ARG-ST} & \langle \text{NP}_{\boxed{1}} \rangle \\ \text{CONTENT} & \left[\begin{array}{ll} \text{PRED} & \textit{active-cause} \\ \text{BECOME} & \left[\begin{array}{ll} \textit{contiguous-rel} & \\ \text{THEME} & \boxed{1} \\ \text{LOCATION} & \boxed{2} \end{array}\right] \end{array}\right] \end{array}\right]$$

The theme value ($\boxed{1}$) is the index of the sole argument of the preposition (*hay* in (5.401)), while the location ($\boxed{2}$) is assigned only once this CONTENT is 'unified' with the CONTENT of the verb, which specifies that the value of LOCATION is the index of the complement of the verb, i.e., *the truck* in (5.401).

(5.403)
$$\left[\begin{array}{ll} \textit{word} & \\ \text{PHON} & \text{load} \\ \text{ARG-ST} & \langle \text{NP}_{\boxed{3}}, \text{NP}_{\boxed{2}}, \text{PP}{:}\boxed{0} \rangle \\ \text{CONTENT}\ \boxed{0} & \left[\begin{array}{ll} \text{PRED} & \left[\begin{array}{ll} \textit{pred-rel} & \\ \text{LOADER} & \boxed{3} \\ \text{GOAL} & \boxed{2} \\ \text{THEME} & \boxed{1} \end{array}\right] \\ \text{AGENCY} & \left[\begin{array}{ll} \text{AGENT} & \boxed{3} \end{array}\right] \\ \text{BECOME} & \left[\begin{array}{ll} \textit{contiguous-rel} & \\ \text{THEME} & \boxed{1} \\ \text{LOCATION} & \boxed{2} \end{array}\right] \end{array}\right] \end{array}\right]$$

[150] A similar idea of thematic predication is present in Verspoor (1997, ch.3).

One difference between the PP[*za*] and the thematic predicative prepositions considered by Wechsler (1997) is that the latter are syntactically optional: they are added to a verb's ARG-ST by a general and optional rule and their CONTENT is identified with the CONTENT of the verb, thus further constraining its value. However, nothing forces them to appear, so that sentences such as (5.404) are grammatical.

(5.404) John loaded the truck.

By contrast, the PP[*za*] in (5.378) is obligatory:

(5.405) *Uważałem go.
considered$_{1st,sg,masc}$ him$_{acc}$

More seriously, for this analysis to work, the verb *uważać* 'consider' would have to assign a role to its object, but this would contradict the main property of raising verbs, i.e., that they do not assign a role to the raised argument.

Finally, analysing the PP[*za*] as a thematic predicate would predict only coindexation of the subject of the predicative AP with the object of the verb, instead of the expected full structure-sharing of *synsem* characteristic for raising.

In summary, none of the alternatives to our analysis of P + predicative AP constructions suggested in (5.388)–(5.390) is without problems. Below, we will make our analysis more precise and point out its interesting consequences.

The problem with the analysis of (5.378), repeated below, assuming the values of ARG-STs as in (5.388)–(5.390), also repeated below for ease of reference, is that it is not clear how to ensure the structure-sharing between the subject of *szczerego* and the object of *uważałem*.

(5.378) Uważałem$_{1st,sg,masc}$ go za szczerego.
considered him$_{acc}$ for sincere$_{acc}$
'I considered him to be sincere.'

(5.388) *szczerego*: [ARG-ST ⟨$\boxed{1}$NP⟩]

(5.389) *za*: [ARG-ST ⟨AP⟩]

(5.390) *uważałem*: [ARG-ST ⟨NP, $\boxed{1}$NP, PP[*za*]⟩]

Note that, on standard assumptions, the PP[*za*] on the ARG-ST of the verb does not contain any information about its predicative complement (apart, perhaps, from its CONTENT), so it also does not contain any information about the subject of this predicative AP. The verb cannot, thus, lexically specify the structure-sharing of its object with the subject of the predicative AP, contrary to the standard analysis of raising verbs.

In order to solve this problem, we have to go beyond the standard assumptions, and make the information about the internal structure of arguments of prepositions available at the *synsem* corresponding to the maximal projection of this preposition. The simplest way to do that, with precedences in the HPSG literature (Frank, 1994; Frank and Reyle, 1995, 1996; Grover, 1995; Baxter, 1999b), is to make ARG-ST a head feature, i.e., present not only on *words*, as often assumed (Miller and Sag, 1997; Abeillé *et al.*, 1998b; Bouma *et al.*, 1999b), but also on *phrases*. With this modification, the verb *uważać* 'consider' may be specified as having the following (partial and schematic) lexical entry:[151]

(5.406)
$$\left[\begin{array}{l} \textit{word} \\ \text{PHON uważać} \\ \text{ARG-ST } \left\langle \text{NP}_{\boxed{1}}, \boxed{0}, \text{PP}\left[\begin{array}{l} \text{PFORM za} \\ \text{ARG-ST } \left\langle \left[\begin{array}{l} \text{SUBJ } \langle \boxed{0} \rangle \\ \text{CONT } \boxed{2} \end{array}\right] \right\rangle \end{array}\right] \right\rangle \\ \text{CONT } \left[\begin{array}{l} \textit{consider} \\ \text{CONSIDERER } \boxed{1} \\ \text{SOA-ARG } \boxed{2} \end{array}\right] \end{array}\right]$$

With such lexical entries, the main properties of 'raising across a preposition' verbs, such as *uważać*, are taken into account. First, the subject of the predicative AP is structure-shared with the object of the verb. Second, this object is not assigned a semantic role directly in the CONTENT of the verb, but rather in the CONTENT of the predicative AP, which becomes the value of the verb's CONT|SOA-ARG.[152] Third, the assumptions of the previous paragraph concerning ARG-STs of *szczerego*, *za*, and *uważałem* (see (5.388)–(5.390)) are justified by the lexical entry (5.406).

In §5.4.3, we will see one more argument for allowing ARG-ST to occur on *phrases*, in addition to *words*.[153]

5.4.1.3 Case of Predicative Phrases

After modifying the CASE PRINCIPLE so that it does not apply to agreeing predicative phrases, we turn to formulating the principle responsible for case agreement between a case-bearing predicate (AP or NP) and its subject, as well as for the possibility of the instrumental case on the predicate.

In HPSG, case agreement between a predicate and the predicated phrase is naturally analysed as agreement between the predicate and its subject. Thus, the first version of the PREDICATIVE CASE (NON-)AGREEMENT principle could be stated as follows:

(5.407) PREDICATIVE CASE (NON-)AGREEMENT (first version):

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[151] We ignore here the difference between *synsem* and *argument*, see (4.38)–(4.39) on p.94.

[152] If the preposition *za* takes over the CONTENT value of its argument, than this structure-sharing could be specified as holding between the verb's CONT|SOA-ARG and the *preposition*'s CONT.

[153] An alternative to the analysis presented above would be to say that, although verbs such as *uważać* + *za* 'consider as' are semantically raising verbs, they do not structure-share full *synsems* of their raised arguments with subjects of the predicative APs (or NPs) but, instead, raised arguments are only co-indexed with these subjects. This would require abandoning the standard HPSG assumption that semantic raising implies structure-sharing of *synsems*, but this is not so controversial in view of the fact that Polish violates the mirror assumption, namely, that structure-sharing of *synsems* implies semantic raising; see §5.4.2. Nevertheless, we leave exploring this possibility for future research.

$$\begin{bmatrix} \text{VAL}|\text{SUBJ} & \langle \text{XP}[\text{CASE } \boxed{1}] \rangle \\ \text{HEAD} & \begin{bmatrix} \text{PRD} & + \\ \text{CASE} & \boxed{2} \end{bmatrix} \end{bmatrix} \rightarrow (\boxed{1} = \boxed{2}) \vee (\boxed{2} = \mathit{lins})$$

This principle would, however, wrongly predict case agreement between an NP argument of the verb and an AP predicative embedded in a PP; the relevant examples are repeated below.

(5.379) Janek wyglądał na szczerego.
John$_{nom}$ looked as sincere$_{acc}$
'John seemed to be sincere.'

(5.380) Nie uważałem jej za szczerą.
NM considered her$_{gen}$ for sincere$_{acc}$
'I didn't consider her to be sincere.'

Since these verbs are raising verbs, the subject of the predicate should be analysed as structure-shared with the raised argument of the verb, i.e., it should bear the nominative case in (5.379) and the genitive (of negation) in (5.380), instead of the accusative.

However, as the subject of the predicate does not raise to the immediately higher ARG-ST, it is marked as [RAISED −] and the whole predicate is subject to the CASE PRINCIPLE, i.e., it receives the accusative case (via clause (5.386)). This shows that predicates should not agree in case with their subjects if these subjects are [RAISED −]; if they did, they would be in the scope of both CASE PRINCIPLE and PREDICATIVE CASE (NON-)AGREEMENT principle, which would generally lead to case clashes. Instead, predicates should agree only with [RAISED +] subjects:

(5.408) PREDICATIVE CASE (NON-)AGREEMENT (second version):

$$\begin{bmatrix} \text{VAL}|\text{SUBJ} & \langle \text{XP}^{+}[\text{CASE } \boxed{1}] \rangle \\ \text{HEAD} & \begin{bmatrix} \text{PRD} & + \\ \text{CASE} & \boxed{2} \end{bmatrix} \end{bmatrix} \rightarrow (\boxed{1} = \boxed{2}) \vee (\boxed{2} = \mathit{lins})$$

Two more modifications of the PREDICATIVE CASE (NON-)AGREEMENT principle are necessary. First, since all cases of subject raising from a case bearing phrase that we are aware of involve predicative phrases, the [PRD +] specification above is superfluous and can be dropped. Second, we argued in §5.1.5 above that instrumental predicative NPs may only predicate of structural NPs. As the data considered in §5.4.1.1 (see the contrast between (5.358)–(5.366) and (5.370)–(5.372)) suggest, also instrumental predicative APs cannot predicate of lexical NPs. This observation is captured by the third version of the PREDICATIVE CASE (NON-)AGREEMENT principle, given below.

(5.409) PREDICATIVE CASE (NON-)AGREEMENT (third version):

$$\begin{bmatrix} \text{VAL}|\text{SUBJ} \ \langle \text{XP}^{+}[\text{CASE } \boxed{1}] \rangle \\ \text{HEAD}|\text{CASE} \ \boxed{2} \end{bmatrix} \rightarrow (\boxed{1} = \boxed{2}) \vee (\boxed{1} = \mathit{str} \wedge \boxed{2} = \mathit{lins})$$

Let us illustrate this principle with a couple of examples. First, the PREDICATIVE CASE (NON-)AGREEMENT principle predicts that complements of verbs such as the predicative copula *być*, *okazać się* 'turn out', and *zrobić się* 'become', as in (5.351)–(5.353) on p.201, should be either nominative (agreeing with the case of the subject), or instrumental. This is because the subject of this complement is raised to the immediately higher ARG-ST, i.e., to the subject position of the verb, and, hence, is marked as [RAISED +]. This in turn means that the PREDICATIVE CASE (NON-)AGREEMENT applies and the complement must either agree in case with its subject, or occur in the instrumental case. This is indeed the case, although, in case the complement is an NP, the instrumental is usually strongly preferred, while in case of AP complements, it is the agreement that is strongly preferred:

(5.410) a. Ona jest miła / ?*miłą.
she$_{nom}$ is nice$_{nom}$ / nice$_{ins}$
'She is nice.'

b. On jest ?prezydent / prezydentem.
he$_{nom}$ is president$_{nom}$ / president$_{ins}$
'He is the president.'

c. Jesteś zwykła świnia / zwykłą świnią.
be$_{2nd,sg}$ ordinary$_{nom}$ swine$_{nom}$ / ordinary$_{ins}$ swine$_{ins}$
'You are an ordinary swine.'

(5.411) a. Maria okazała się przyjacielska / ??przyjacielską.
Mary$_{nom}$ turned out RM friendly$_{nom}$ / friendly$_{ins}$
'Mary turned out to be friendly.'

b. Janek okazał się ?*drań / draniem.
John$_{nom}$ turned out RM cad$_{nom}$ / cad$_{ins}$
'John turned out to be a cad.'

It is occasionally claimed that examples such as (5.410a) are simply ungrammatical, and if they do not sound completely unacceptable, it is only because of the possibility of an elliptical reading, in which the complement of the copula is really an NP, with the head noun missing. However, we will see below that a number of factors can make the instrumental complement of copula acceptable, the most obvious being the lack of subject (§5.4.1.4), but also structural distance effects in control environments (§5.4.2) and numeral subjects (§5.4.3). For this reason, we maintain that syntax allows, in principle, both case agreement and instrumental case on the predicate, with additional factors often making one or the other of these two options strongly preferable.

Second, note that this analysis may be extended to non-subcategorized predicative XPs, such as those in (5.354)–(5.364) and (5.366)–(5.369) (pp.202–203) only if these predicative XPs are actually present on ARG-STs of the verbs and share their subjects with some arguments of these verbs. An analysis along these lines will be presented in the next Part of this study, and we will come back to these examples there.

Third, we already saw that the PREDICATIVE CASE (NON-)AGREEMENT principle does not affect the case of predicates which are arguments of non-predicative prepositions; see (5.379) and (5.380) above. This principle also does not affect controlled predicates, such as the complement of *udawać* 'pretend' in (5.375), repeated below.

(5.375)	Maria	udaje	szczerą.
	Mary$_{nom}$	pretends	sincere$_{acc}$
	‘Mary pretends to be sincere.’		

The subject of the predicate *szczerego* is not raised to the subject of the verb, so it is marked as [RAISED −]. This means that the predicative AP is not affected by the PREDICATIVE CASE (NON-)AGREEMENT, but is instead subject to the CASE PRINCIPLE. We will look closer at such unrealized and unraised subjects in the next subsection.

5.4.1.4 Case of PRO

In this subsection we will deal with examples such as (5.373b–c)–(5.374b–c) above, repeated as (5.412)–(5.413) below.

(5.412)	a.	Bycie	miłym	/	*miły	ma	sens.		
		being	nice$_{ins}$	/	nice$_{nom}$	has	sense		
		‘Being nice makes sense.’							
	b.	Być	miłym	/	*miły	to	być	głupim	/ *głupi.
		be$_{inf}$	nice$_{ins}$	/	nice$_{nom}$	is	be$_{inf}$	stupid$_{ins}$	/ stupid$_{nom}$
		‘To be nice is to be stupid.’							
(5.413)	a.	Wrócenie	?pijanym	/	*pijany	to	głupota.		
		returning	drunk$_{ins}$	/	drunk$_{nom}$	is	stupidity		
		‘Coming back drunk is a stupidity.’							
	b.	Wrócić	pijanym	/	*pijany	to	dyshonor.		
		return$_{inf}$	drunk$_{ins}$	/	drunk$_{nom}$	is	dishonour		
		‘To come back drunk is a dishonour.’							

The question we will try to answer is: Why is only the instrumental case possible on the predicative APs (or NPs, not shown here) in such cases? The basic intuition behind the answer we will develop here is simple: there are, in principle, two options for predicative case ‘(non-)agreement’, i.e., either the real case agreement with a case-bearing argument, or instrumental case marking on the AP/NP predicate; however, since there is no case-bearing argument in (5.412)–(5.413) above (PRO is, in a sense to be made precise below, case-less), only the instrumental option is available, even though it might be strongly dispreferred in analogous examples involving a case-bearing argument.

Below, we will argue against the most obvious alternative, i.e., that PRO is instrumental in Polish, and then we will formalize our analysis in HPSG.

Instrumental PRO in Polish? One possibility of analysing data such as (5.412)–(5.413) would be to say that the unrealized subject in such constructions, called PRO in GB, bears the instrumental case. This approach is, however, problematic on a number of counts.

The first problem is that, if PRO were analysed as instrumental, then either we would have to assume that there is structural instrumental in Polish, contrary to the considerations of §5.1

which showed that the instrumental case is (otherwise) always lexical, or we would have to assume that the case of PRO is *l*exical *ins*trumental, contrary to the generalization that subjects of most verbs (including the two verbs in examples (5.412)–(5.413)) in Polish bear the structural case.

The second problem would be that the instrumental case on predicative APs (or NPs) in examples such as (5.412)–(5.413) would be unrelated to the 'non-agreeing' instrumental case of the predicate as in, e.g., (5.410)–(5.411), and other examples above not involving a PRO; it would be a sheer coincidence that both PRO and the 'non-agreeing' case of predicative APs (and NPs) are instrumental.

Finally, if examples (5.412)–(5.413) were taken as arguments for an instrumental PRO, then examples (5.414)–(5.415) should be taken as providing evidence for the *dativeness* of PRO.[154]

(5.414) a. Bycie samemu / ?*samym / *sam ma sens.
being alone$_{dat}$ / alone$_{ins}$ / alone$_{nom}$ has sense
'Being alone makes sense.'

b. Być samemu / ?*samym / *sam to być głupim / *głupi.
be$_{inf}$ alone$_{dat}$ / alone$_{ins}$ / alone$_{nom}$ is be$_{inf}$ stupid$_{ins}$ / stupid$_{nom}$
'To be alone is to be stupid.'

(5.415) a. Wrócenie samemu / ?*samym / *sam to głupota.
returning alone$_{dat}$ / alone$_{ins}$ / alone$_{nom}$ is stupidity
'Coming back alone is a stupidity.'

b. Wrócić samemu / ?*samym / *sam to dyshonor.
return$_{inf}$ alone$_{dat}$ / alone$_{ins}$ / alone$_{nom}$ is dishonour
'To come back alone is a dishonour.'

The relevance of such data could be rejected by saying that *samemu* is a 'lexicalised form', or an adverb, here, as it normally occurs only in the masculine singular form (for such claims, usually made in passing, see, e.g., Comrie (1974, p.140), Kardela (1986a), and Franks (1995, p.264)). However, the same could be said about the instrumental adjectives in (5.412)–(5.413), they also normally occur only in the singular masculine form, which happens to reflect the default specifications of the arbitrary PRO. Moreover, in cases of controlled PRO, to be discussed in the next section, other values of gender and number are possible in both cases alike, although sometimes (but still in both cases) only marginally so:

(5.416) {Radziłem / Kazałem} jej {przyjść / być} {samej / trzeźwą}.
advised$_{1st,sg,masc}$ / ordered$_{1st,sg,masc}$ her$_{dat}$ come$_{inf}$ / be$_{inf}$ alone$_{dat,sg,fem}$ / sober$_{ins,sg,fem}$
'I advised/asked her to come/be alone/sober.'

[154] In fact, such semi-predicative data have often been analysed as involving case agreement between PRO and the apparently dative element, e.g., Comrie (1974), Neidle (1982, 1988), Laurençot (1997) and Babby (1998).

(5.417) Uczyłem ją wytrwać ?samej / ?trzeźwą.
taught$_{1st,sg,masc}$ her$_{acc}$ endure$_{inf}$ alone$_{dat,sg,fem}$ / sober$_{ins,sg,fem}$
'I taught her how to endure alone/sober.'

(5.418) Kazałem im być ?samym w domu / ?grzecznymi.
ordered$_{1st,sg,masc}$ them$_{dat}$ be$_{inf}$ alone$_{dat,pl}$ at home / polite$_{ins,pl}$
'I asked them to be alone at home / polite.'

This means that the dative semi-predicate[155] *sam* is as agreeing / non-agreeing with the PRO as instrumental predicative APs and NPs. This, in turn, means that either both sets of data provide arguments for the corresponding case of PRO, i.e., PRO simultaneously bears dative and instrumental case, or neither set of data constitutes evidence for the case of PRO. Since it seems too far-fetched to assume that PRO bears two cases at the same time,[156] one agreeing with the semi-predicate, other agreeing with ordinary predicates, we opt for the second alternative and conclude that there is no evidence for instrumental PRO in Polish.[157]

Case-less PRO in HPSG Once we reject the instrumental PRO hypothesis, we return to the question of the correct analysis of the data in (5.412)–(5.413). Our considerations so far, as well as various HPSG-theoretical assumptions, pose certain restrictions as to what such a possible analysis would involve.

First, for a number of reasons, we cannot say that the instrumental case is the result of the *lack* of subject on the ARG-ST of infinitival verbs, gerunds, etc. For one thing, since such unrealized subjects may be antecedents of anaphors, as in (5.419) below, this would contradict the standard assumption that ARG-ST is the locus of binding theory.

(5.419) a. Być sobą to być głupcem.
be$_{inf}$ Self$_{ins}$ is be$_{inf}$ fool$_{ins}$

[155] See Comrie (1974), Neidle (1982, 1988), Franks (1995) and Bailyn (1995, p.342) for this terminology.

[156] Another alternative would be to postulate two PROs, one instrumental and the other dative. Not only does it seem *ad hoc*, but also runs against the (marginal) possibility of coordinating dative and instrumental predicates, cf. (i) below, so we do not consider this alternative here.

(i) ?być w domu samemu i, w dodatku, chorym...
be$_{inf}$ in home alone$_{dat}$ and in addition ill$_{ins}$
'to be at home alone and, in addition, ill...'

[157] The question remains about the source of the dative case on the semi-predicative *sam*. We remain agnostic on this issue, but one possibility would be to revise the PREDICATIVE CASE (NON-)AGREEMENT principle (5.409) by restricting the instrumental option to true predicates and adding the third disjunct to the consequent of (5.409) responsible for the dative case of semi-predicates. Such revised version would predict that the semi-predicate may occur in the dative case also when referring to an overtly realized NP, not just when it refers to PRO. This possibility, although very restricted, is illustrated with (i) below, from Comrie (1974) and Kardela (1986a):

(i) Ty nic tu nie wskórasz samemu.
you$_{nom}$ nothing here NM achieve alone$_{dat,sg,masc}$
'You won't achieve anything here alone.'

'To be oneself is to be a fool.'

b. Czasami trzeba dogadzać sobie.
sometimes necessary pamper$_{inf}$ Self$_{dat}$
'It is sometimes necessary to pamper oneself.'

For the other, our general approach, successful so far, of analysing case assignment and case agreement in terms of ARG-ST would have to be revised. Moreover, the gender and number agreement facts in (5.416)–(5.418) would be rather mysterious if there were no PRO to agree with the predicates.

Second, it cannot be said that the subject of infinitival verbs, gerunds, etc., is always case-less. It is cased in raising (and subject control; see §5.4.2) constructions such as (5.420) below.

(5.420) Janek wydawał się być miły.
John$_{nom}$ seemed RM be$_{inf}$ nice$_{nom}$
'John seemed to be nice.'

If case agreement between a predicate and the predicated NP is analysed as case agreement between the predicate and its subject, as standard, and if the subject of the predicative AP is structure-shared with the subject of the predicative copula, also a standard assumption, then in (5.420) the subject of the infinitival copula bears the nominative case. On the other hand, the PRO subject of the infinitival copula clearly cannot bear the nominative case in (5.412) above (p.217).

Now, if PRO in (5.412) were case-less in the strong sense of lacking the feature CASE altogether, then, in terms of HPSG, the infinitival copula (or any other infinitival verb, for that matter) would have to either be underspecified as to whether its subject has CASE feature at all, or would have to have alternative subcategorization frames, i.e., one with a CASE-less subject (as in (5.412)), and one with CASEed subject (as in (5.420)). Neither solution is satisfying, though, because on either the subcategorization frame (ARG-ST list) of the infinitival verb would have to be remarkably different from that of its finite form, which never accepts CASE-less subjects.

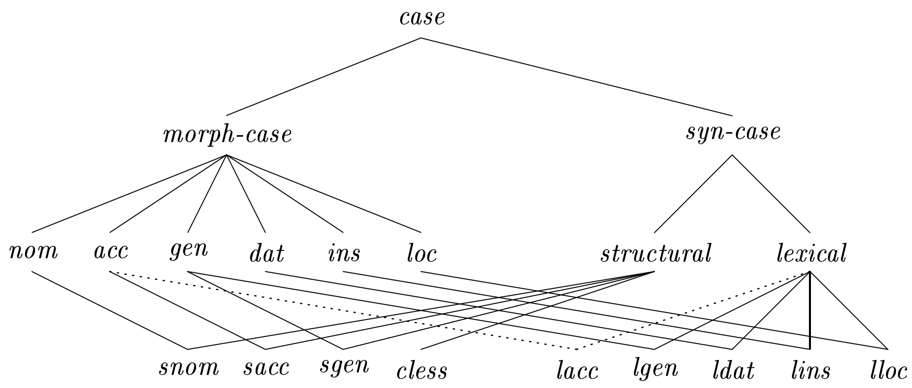
Below, we will see that it is not necessary to posit different subcategorization frames for finite and infinitive verbs, i.e., we will pursue the parsimonious hypothesis that (most) infinitive verbs, just like their finite counterparts, subcategorize for a NP[*str*]. One consequence of this will be that PRO is really a kind of NP[*str*].

On our account, PRO is simply a *synsem* bearing a special case value *caseless* (abbreviated to *cless*).[158] This new *case* type is a subtype of *str*, i.e., it is a new structural case, but unlike other cases, it is never morphologically realized, i.e., it is not a subtype of *morph-case*.[159] This is illustrated in the revised case hierarchy for Polish:

[158]Note the similarity to the Null Case Hypothesis of Chomsky and Lasnik (1995).

[159]A similar account of PRO as bearing a 'null case' that cannot be overtly realized was also proposed by Franks (1998b, p.157), which came to our attention after this Chapter had been completed.

(5.421)



We assume that in Polish there are no overt *sign*s with *caseless* CASE values, i.e., we assume the following constraint for Polish:[160]

(5.422) $\begin{bmatrix} \textit{sign} \\ \text{SS}|\ldots|\text{CASE } \boxed{1} \end{bmatrix} \rightarrow \boxed{1} = \textit{morph-case}$

On the other hand, it is occasionally claimed for various languages that some items normally expected to bear case are actually case-less; see, e.g., Franks's (1986) remarks on Serbo-Croatian quantifier phrases. We suggest that the type *caseless* captures all relevant intuitions behind such claims; after all, saying that an NP is case-less puts it in opposition to all case values and is in a way tantamount to positing a new case-value. However, this new case value is different from other case values in being a purely syntactic, not morphosyntactic, concept. All this is explicated in (5.421).

The last bit of the analysis necessary to account for examples such as (5.412)–(5.413) above is a principle saying that structural unraised subjects of non-finite verbs are *caseless*. This calls for replacing the two clauses of the CASE PRINCIPLE responsible for case assignment to (numeral or non-numeral) subjects with the following three clauses:[161]

(5.423) $\begin{bmatrix} \textit{category} \\ \text{HEAD } \textit{verb}\neg[\textit{fin}] \\ \text{ARG-ST } \langle \text{CFC}[\text{CASE } \textit{str}]\rangle \oplus \boxed{1} \end{bmatrix} \rightarrow \begin{bmatrix} \text{ARG-ST } \langle[\text{CASE } \textit{cless}]\rangle \oplus \boxed{1} \end{bmatrix}$

(5.424) $\begin{bmatrix} \textit{category} \\ \text{HEAD } \textit{verb}[\textit{fin}] \\ \text{ARG-ST } \langle \text{CFC}\begin{bmatrix} \text{CASE } \textit{str} \\ \text{NUM } - \end{bmatrix}\rangle \oplus \boxed{1} \end{bmatrix} \rightarrow \begin{bmatrix} \text{ARG-ST } \langle[\text{CASE } \textit{snom}]\rangle \oplus \boxed{1} \end{bmatrix}$

(5.425) $\begin{bmatrix} \textit{category} \\ \text{HEAD } \textit{verb}[\textit{fin}] \\ \text{ARG-ST } \langle \text{CFC}\begin{bmatrix} \text{CASE } \textit{str} \\ \text{NUM } + \end{bmatrix}\rangle \oplus \boxed{1} \end{bmatrix} \rightarrow \begin{bmatrix} \text{ARG-ST } \langle[\text{CASE } \textit{sacc}]\rangle \oplus \boxed{1} \end{bmatrix}$

[160] Depending on other parts of the grammar, in particular, on the analysis of gaps, pro and PRO, it may be necessary to strengthen (5.422) to the effect that only PRO can bear the CASE value of *caseless*.

[161] At the moment, (5.423) takes care of the subject of non-finite verbs, as in (5.412b)–(5.413b), but not of unrealized subjects of verbal nouns, as in (5.412a)–(5.413a). We will not deal with this extension here because, in view of the mixed verbal/nominal characteristics of such verbal nouns, it is not clear what their HEAD value should be.

Let us see how this analysis deals with predication of PRO; we will illustrate it with example (5.412b), repeated below as (5.426).

(5.426) Być miłym / *miły to być głupim / *głupi.
be$_{inf}$ nice$_{ins}$ / nice$_{nom}$ is be$_{inf}$ stupid$_{ins}$ / stupid$_{nom}$
'To be nice is to be stupid.'

First, the copula *być* is a bi-valent verb subcategorizing for an NP[*str*] subject and a predicative XP whose subject is structure-shared with the subject of *być*:[162]

(5.427) *być*: $\left[\text{ARG-ST } \langle \boxed{1}\text{NP}[\textit{str}], \text{XP}\begin{bmatrix} \text{SUBJ } \langle \boxed{1} \rangle \\ \text{PRD } + \end{bmatrix} \rangle \right]$

Second, since the subject of the predicative XP is raised to the ARG-ST of the verb, but not any higher, it is marked as [RAISED +] on the SUBJ (and ARG-ST) of the XP, and as [RAISED −] on the ARG-ST of the verb (see (4.40) on p.94 for this marking). This means, that the subject of the copula is a CFC (assuming it has no subject itself), but the predicative XP is not, nor is the subject of this predicative XP (see the definition (5.381) of CFC on p.207).

Third, since the subject of the verb is a CFC, the CASE PRINCIPLE will resolve its structural case. In particular, *być* is an infinitival verb, so (5.423) above will apply and it will assign the subject of the copula the *caseless* value of CASE. Because of structure-sharing between the subject of the copula and the subject of the XP, this means that the latter will also be [CASE *cless*].

Finally, according to the PREDICATIVE CASE (NON-)AGREEMENT principle (5.409) on p.215, either the case of the XP and that of its subject are equal, i.e., *caseless*, or the case of the XP is instrumental and that of its subject is structural. The former option is unavailable, though: if the predicative XP bore the *caseless* CASE value, then, according to (5.422), it could not be realized as a *sign* (recall that *caseless* is not a subtype of *morph-case*; cf. (5.421)). On the other hand, the latter option is unproblematic: *caseless* is a structural case, so the XP may occur in the instrumental case.

So, the complex interaction of the rather simple principles responsible for case assignment and (predicative) case agreement leads to the correct analysis of the instrumental case on predicative APs (and NPs) predicating of PRO.

5.4.2 Subject Control and Object Control

One prediction of the above theory of case agreement in predicative constructions is that, when a predicative AP/NP refers to the subject of an infinitival verb which is itself the complement of a raising verb, then this predicative XP should agree with the subject of the matrix verb, i.e., it should occur in the nominative case, with instrumental being only a strongly dispreferred (blocked) option. This is because, once the subject of the infinitival verb is raised higher, it is marked as [RAISED +] and the CASE PRINCIPLE (clause (5.423)) does not apply. Instead, case

[162] Again, we ignore the difference between *synsem* and *arg* here.

will be assigned to this raised subject at its highest occurrence, i.e., on the finite matrix verb, so it will be nominative, according to the clause (5.424) of the CASE PRINCIPLE.[163] This is indeed a correct analysis, as the examples below show.

(5.428) Janek wydawał się być miły / ?*miłym.
John$_{nom}$ seemed RM be$_{inf}$ nice$_{nom}$ / nice$_{ins}$
'John seemed to be nice.'

(5.429) Janek zaczął wracać do domu pijany / ?*pijanym.
John$_{nom}$ started come to home drunk$_{nom}$ / drunk$_{ins}$
'John started coming home drunk.'

However, our analysis would also predict that, when the predicated subject of an infinitival verb is only controlled, not raised, then this controlled subject should be assigned the *caseless* case, so the predicate should occur in the instrumental case, according to the same reasoning as that applied to (5.426) above. This expectation, though, is fulfilled only partially; as the examples below show, in cases of object control, the predicate must bear the instrumental case, but in cases of subject control, the predicative AP (or NP) agrees in case with the matrix subject.

(5.430) a. Kazałem jej być / przyjść trzeźwą.
ordered$_{1st,sg,masc}$ her$_{dat}$ be$_{inf}$ / come$_{inf}$ sober$_{ins}$
'I asked her to be/come sober.'

b. Uczyłem go być / przychodzić na spotkania (zawsze) trzeźwym.
taught$_{1st,sg,masc}$ him$_{acc}$ be$_{inf}$ / come to meetings always sober$_{ins}$
'I taught him to be / come to meetings (always) sober.'

(5.431) a. Janek chce być / przyjść trzeźwy / ???trzeźwym.
John$_{nom}$ wants be$_{inf}$ / come$_{inf}$ sober$_{nom}$ / sober$_{ins}$
'John wants to be/come sober.'

b. Maria obiecała być / przyjść trzeźwa / ???trzeźwą.
Mary$_{nom}$ promised be$_{inf}$ / come$_{inf}$ sober$_{nom}$ / sober$_{ins}$
'Mary promised to be/come sober.'

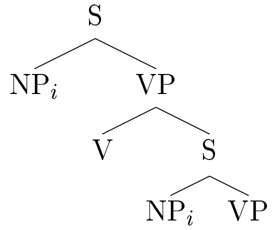
All object control verbs (e.g., *radzić* 'advise', *pomagać* 'help', *zabraniać* 'forbid', *udać się* 'succeed', *żal* 'be sorry', etc.) behave like *kazać* 'order, ask' and *uczyć* 'teach' in (5.430), and all subject control verbs (e.g., *bać się* 'fear', *zdecydować się* 'decide', *lubić* 'like', *postanowić* 'decide', *zapomnieć* 'forget', etc.) behave like *chcieć* 'want' and *obiecać* 'promise' in (5.431).

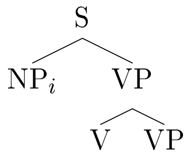
In this section, we will try to explain this unexpected behaviour.

5.4.2.1 Previous Considerations

The first generative account of such data, mainly in Russian, is Comrie (1974), who posits, for subject control cases such as (5.431), a restructuring rule which converts structures such as (5.432a) into (5.432b).

[163] This assumes that the subject is non-numeral. See §5.4.3 on numeral subjects and predication.

(5.432) a. 

b. 

Comrie's (1974) analysis is, however, rather imprecise and infested with various difficulties, pointed out by Neidle (1982, 1988), so we will not consider it here.

Another analysis, based solely on Russian data, is Neidle (1982, 1988) (within LFG). She builds on the distinction between grammatical (functional) control and anaphoric control, introduced and discussed in Bresnan (1982a). In LFG terms, grammatical control involves full identity of all functional features, including CASE, while anaphoric control involves only referential identity. Moreover, in cases of anaphoric control, the controlled element is always PRO, lexically introduced by its governor.

Now, according to the analysis of Neidle (1982, 1988), in Russian, subject control is an instance grammatical control, so it involves sharing of the CASE feature, and object control is always anaphoric, i.e., it involves PRO with its own CASE feature. The difference should be testable in that, in cases of grammatical control, the controller is fixed, while in cases of anaphoric control, there is certain freedom in the choice of the controller. This means that object-controlled elements should actually be able to take other controllers. This is in fact what Neidle (1982, p.410) reports:

(5.433) Ja poprosila ego ne byt' žestokim.
I$_{nom}$ asked$_{sg,fem}$ him$_{acc}$ NM be$_{inf}$ cruel$_{sg,masc,ins}$
'I asked$_{fem}$ him not to be cruel$_{masc}$.'

(5.434) Ja poprosila ego ne byt' isključënnoj iz školy.
I$_{nom}$ asked$_{sg,fem}$ him$_{acc}$ NM be$_{inf}$ expelled$_{sg,fem,ins}$ from school
'I asked$_{fem}$ him not to be expelled$_{fem}$ from school.'

Hence, "since the interpretation of the subject of the embedded verb depends on the context, the subject is not grammatically controlled" (Neidle, 1982, p.410).

This analysis, as it stands, cannot be carried over to Polish because in this language, object control seems to be as 'grammatical' as subject control, compare Russian (5.433)–(5.434) with Polish (5.435) and (5.436).

(5.435) a. Zabroniłam mu być okrutnym.
forbade$_{sg,fem}$ him$_{dat}$ be$_{inf}$ cruel$_{sg,masc,ins}$
'I(fem) forbade him to be cruel.'

b. *Zabroniłam mu być wyrzuconą ze szkoły.
forbade$_{sg,fem}$ him$_{dat}$ be$_{inf}$ expelled$_{sg,fem,ins}$ from school
'I forbade him to be expelled from school.' (intended)

(5.436) a. Uczyłam go kochać mnie.
taught$_{sg,fem}$ him$_{acc}$ love$_{inf}$ me
'I taught him (how) to love me.'

b. *Uczyłam go być kochaną.
taught$_{sg,fem}$ him$_{acc}$ be$_{inf}$ loved$_{sg,fem,ins}$
'I taught him how to love me.' (intended)

Nevertheless, our analysis below will be essentially that of Neidle (1982, 1988) in the sense that subject control, but not object control, will involve full structure-sharing of relevant *synsem*s.

An interesting discussion of case and control in Polish is contained in Franks (1983, 1995). On the basis of examples such as (5.431), Franks (1983, 1995) argues that, contrary to standard GB assumptions, PRO must be able to bear case in order to transmit it from its subject controller to the predicative adjective. Unfortunately, Franks (1983, 1995) only tentatively sketches various possible conditions on and mechanisms of this case transmission, without really developing any of them. Thus, Franks (1983) discusses the idea, rather similar to that of Neidle (1982, 1988), that what is necessary for case transmission is grammatical control, in a rather strong sense of Manzini (1983), in which controllers must c-command (the domain of) PRO. On the other hand, Franks (1995) considers two solutions, both based on the idea that PRO may be either pronominal or anaphoric, but, contrary to the standard assumptions, not both at the same time. One idea is that only the anaphoric PRO bears an index and, as such, 1) it must be properly governed, 2) it may be obligatorily controlled in the sense of Williams (1980), and 3) it may transmit case. This analysis predicts that the indexed (case-transmitting) PRO may occur as a subject of an infinitival verb only when it is properly governed by the higher verb, but this is possible only when there is no intervening object (of the higher verb). This means that case transmission is impossible in cases of object control.

However, this analysis would also predict that case transmission is impossible from the matrix subject as soon as the matrix verb also takes an object. This prediction is false, compare (5.431b) above with (5.437) below.

(5.437) Maria obiecała Jankowi być / przyjść trzeźwa / ??trzeźwą.
Mary$_{nom}$ promised John$_{dat}$ be$_{inf}$ / come$_{inf}$ sober$_{nom}$ / sober$_{ins}$
'Mary promised John to be/come sober.'

Franks (1995, p.244) notes this problem and says that the complement (*Jankowi* above) does not block proper government because it is "not a direct object, but an *indirect* one. This is why it appears in the dative case and is optional." This, clearly, cannot be the right explanation, because exactly the same may be said about the controllers in object control constructions, i.e., that they bear the dative case and are optional, and yet they do block case transmission, see (5.438).[164]

[164] '#' means that the dative is possible on a non-intended reading, namely, when it refers to the object of the matrix verb, rather then the subject of the embedded verb. That is, the meaning of (5.438) with the dative is 'Mary asked John, (when he was) sober, to be/come.' The syntactic reflex of the difference is that the version with dative becomes clearly less acceptable as soon as there is some additional material clearly belonging to the embedded clause and following the predicative AP, e.g.,

(5.438) Maria kazała (Jankowi) być / przyjść #trzeźwemu / trzeźwym.
Mary$_{nom}$ ordered John$_{dat}$ be$_{inf}$ / come$_{inf}$ sober$_{dat}$ / sober$_{ins}$

'Mary asked (John) to be/come sober.'

Another possibility mentioned in Franks (1995) is that subject-orientation of case-transmitting PRO should be assimilated to the subject-orientation of garden variety anaphors in Slavic. However, as Franks (1995) notes himself, this alternative is problematic on a number of counts, so we will not consider it here.[165]

Since these are the only discussions of 'case transmission' taking place in subject control, but not in object control, in Slavic that we are aware of, and neither of them can be directly applied to Polish, we set off in search of an analysis below.[166]

5.4.2.2 Control and Raising Revisited

In order to propose an account of 'case transmission' in control constructions, we have to re-examine the HPSG approach to control and raising.

In HPSG (Pollard and Sag, 1994, §3.5), there are two important differences between obligatory control ('equi') and raising constructions. First, the index of a controller is assigned a role in the CONTENT value of the 'equi verb', but the index of a raised element is not assigned a role in the CONTENT of the 'raising verb'. Second, in case of control, only the *indices* of the controller and of the unrealized controlled subject of the infinitival VP are structure-shared, while in case of raising, the whole *synsem*s are. These two differences are illustrated with the lexical entries of the 'equi' (control) verb *try* and the raising verb *tend* (Pollard and Sag, 1994, p.135).

(5.439) *try* (an equi verb):

(i) Maria kazała (Jankowi) wrócić ?*trzeźwemu / trzeźwym do domu.
Mary asked John$_{dat}$ return$_{inf}$ sober$_{dat}$ / sober$_{ins}$ to home

'Mary asked (John) to come home sober.'

[165] In fact, even if various problems with the approaches of Franks (1995) were overcome, any account in terms of just case transmission is too limited to deal with 'case transmission' from numeral phrases; see §5.4.3 below.

[166] An analysis that came to our attention after completing this Chapter and, hence, cannot be extensively discussed here is Babby (1998). In brief, Babby (1998) claims that, in Russian, only object control involves full infinitive clauses with a PRO subject; in subject control, the 'infinitival clause' is really a bare VP. The 'suprisingly large number of correct predictions' (Babby, 1998, p.24) of that analysis are also the feature of our account, to the extent that they are correct in Polish. However, Babby's (1998) analysis makes at least one prediction that is incorrect for Polish, i.e., that semi-predicates in adverbial participial phrases, which are controlled by subjects, should be nominative; cf. (i), from Franks (1995, p.264):

(i) *Idąc sam, Jan przybył na czas.
going alone$_{nom}$ John$_{nom}$ arrived on time

'Going alone, John arrived on time.' (intended)

See §10.2.3 below for a brief discussion of such examples.

$$\left[\begin{array}{ll} \textit{word} & \\ \text{SS}|\text{LOC} & \left[\begin{array}{ll} \text{CAT}|\text{ARG-ST} & \langle \text{NP}_{\boxed{1}}, \text{VP}[\textit{inf}, \text{SUBJ } \langle \text{NP}_{\boxed{1}}\rangle]{:}\boxed{3}\rangle \\ \text{CONTENT} & \left[\begin{array}{l} \textit{try} \\ \text{TRYER } \boxed{1}\textit{ref} \\ \text{SOA-ARG } \boxed{3} \end{array}\right] \end{array}\right] \end{array}\right]$$

(5.440) *tend* (a raising verb):

$$\left[\begin{array}{ll} \textit{word} & \\ \text{SS}|\text{LOC} & \left[\begin{array}{ll} \text{CAT}|\text{ARG-ST} & \langle \boxed{2}, \text{VP}[\textit{inf}, \text{SUBJ } \langle \boxed{2}\rangle]{:}\boxed{3}\rangle \\ \text{CONTENT} & \left[\begin{array}{l} \textit{tend} \\ \text{SOA-ARG } \boxed{3} \end{array}\right] \end{array}\right] \end{array}\right]$$

Although Pollard and Sag (1994) provide some evidence (from case assignment in Icelandic facts discussed by Andrews (1982) and analysed in HPSG in Sag *et al.* (1992)) that raising involves structure-sharing of more than just *indices*, they do not provide any arguments for the opposite matter, i.e., that grammatical control involves structure-sharing of *only indices*.[167]

The natural question that arises is, Why should these two properties, i.e., no role in CONTENT and structure-sharing of full *synsems*, be correlated? In fact, this correlation is conspicuously absent in the LFG analysis of raising and control, according to which both raising and grammatical (functional) control involve full structure-sharing of relevant f-structures (Bresnan, 1982a). Which analysis is correct?

Exactly this question is considered in depth by Hudson (1998), whose answer is that both are correct. More specifically, although English does not seem to decide between these two alternatives, other languages show that both 'sharing' (of full *synsems*) and 'non-sharing' (only co-indexing) mechanisms of control are necessary in some languages.

Two cases in point are Icelandic and Ancient Greek. Hudson (1998) shows, mainly on the basis of data discussed by Andrews (1982) and Andrews (1971b), respectively, that in both languages, equi (Bresnan's (1982a) functional control, Neidle's (1982) grammatical control) involves full structure-sharing in case of some verbs, but only coindexing in case of others. Crucially, the evidence for either stance is the possibility, or lack thereof, of case agreement between a predicative XP on the lower verb with the controller of the subject of this verb. The relevant examples from Icelandic are (5.441)–(5.442) (from Anderson (1992)):

(5.441) Ég bað hann að vera góðan / góður / *góðum.
I asked him to be good$_{acc}$ / good$_{nom}$ / good$_{dat}$
'I asked him to be good.'

(5.442) Hann skipaði honum að vera góðum / góður / *góðan.
he ordered him$_{dat}$ to be good$_{dat}$ / good$_{nom}$ / good$_{acc}$
'He ordered him to be good.'

What these examples show is that the predicative AP may either agree in case with the controller, or occur in the nominative case, which, as (5.443) (from Maling and Sprouse (1995))

[167] They just say on p.138 that "[t]he analysis of equi in terms of coindexing is well established...", probably having in mind theta-theoretic considerations (GB's theta-criterion, i.e., Chomsky's (1986a) 'no NP may occur in more than one θ-position').

shows, is the 'default' case of predication in Icelandic, analogous to the instrumental of predication in Polish.

(5.443) Að vera kennari / *kennara er mikilvægt.
to be teacher$_{nom}$ / teacher$_{acc}$ is important
'It is important to be a teacher.'

Hudson (1998) argues that while (5.441)–(5.442) are syntactically ambiguous between the 'sharing' and the 'non-sharing' analyses, there are other cases of (functional) control, which allow only coindexation, and not the full structure-sharing of *synsem*s.

We accept Hudson's (1998) conclusions that, contra standard HPSG assumptions (and contra GB's theta criterion), there are cases of control ('equi') which involve full structure-sharing, and that, contra standard LFG assumptions, there are cases of (functional/grammatical) control which involve only identity of reference, and not full structure-sharing. Thus, whether control involves structure-sharing or not "is ultimately an empirical matter" (Hudson, 1998, p.151).

This result gives us the freedom to de-couple the two properties allegedly jointly distinguishing raising from control, i.e., the raised argument being assigned no role in the CONTENT of the raising verb, and the structure-sharing of *synsem*s between the raised argument and its initial position; we assume that, in Polish, control may (in principle) be syntactically realised either via co-indexing or through full structure-sharing. On the other hand, we retain the standard HPSG assumption that raising always involves full structure-sharing, so we must weaken the Raising Principle to an (one way) implicational constraint along the lines of (5.444):[168]

(5.444) RAISING PRINCIPLE (Polish):

If an element of a *word*'s ARG-ST is not assigned a role in this *word*'s CONTENT, then its *synsem* must be structure-shared with the *synsem* of some element of a lower ARG-ST.

Now the analysis of the surprising contrast between subject control and object control, shown in (5.430)–(5.431) repeated below, is simple: subject control involves structure-sharing of *synsem*s, just like raising does, but object control involves only coindexation, without the sharing of full *synsem*s.

(5.430) a. Kazałem jej być / przyjść trzeźwą.
ordered$_{1st,sg,masc}$ her$_{dat}$ be$_{inf}$ / come$_{inf}$ sober$_{ins}$
'I asked her to be/come sober.'

b. Uczyłem go być / przychodzić na spotkania (zawsze) trzeźwym.
taught$_{1st,sg,masc}$ him$_{acc}$ be$_{inf}$ / come to meetings always sober$_{ins}$
'I taught him to be / come to meetings (always) sober.'

[168]Making this constraint more precise and formalizing it would lead us too far afield. See also footnotes 170 and 153.

(5.431) a. Janek chce być / przyjść trzeźwy / ??trzeźwym.
John$_{nom}$ wants be$_{inf}$ / come$_{inf}$ sober$_{nom}$ / sober$_{ins}$
'John wants to be/come sober.'

b. Maria obiecała być / przyjść trzeźwa / ??trzeźwą.
Mary$_{nom}$ promised be$_{inf}$ / come$_{inf}$ sober$_{nom}$ / sober$_{ins}$
'Mary promised to be/come sober.'

Thus, in fact, Polish seems to pattern with Icelandic and Ancient Greek (and, doubtlessly, many other languages) in having at its disposal both options, although it makes use of them in different circumstances; unlike in Icelandic and Ancient Greek, in Polish, structure-sharing never occurs in cases of object control, and it always occurs in cases of subject control.[169]

How do we formalize this analysis? The simplest way of doing that would be to hard-wire it into lexical entries of control verbs, i.e., subject control verbs would lexically require structure-sharing of *synsem*s, while object control verb would require structure-sharing of *indices*.

There are, however, two objections to such a simplistic analysis. First, on this analysis, it would be an accident that *all* subject control verbs involve structure-sharing of *synsem*s and *none* of object control verbs do. Second, such an analysis does not, in fact, ensure that object control, apart from involving co-indexing, does not involve full structure-sharing.[170]

Thus, instead of assuming that action takes place in lexical entries of control verbs, we posit a grammatical constraint to the effect that, whenever an element XP of ARG-ST controls the subject of a different element, YP, of this ARG-ST, then XP and the subject of YP share their *synsem*s if and only if XP is the first element on this ARG-ST (it is the subject). Semi-formally:[171]

(5.445) CONTROL PRINCIPLE (Polish; 1st version):

$$\begin{array}{l}(\left[\textsc{arg-st}\ \boxed{0}\right] \wedge \\ \texttt{member}(\boxed{2}\mathrm{XP}_{\boxed{1}},\boxed{0}) \wedge \\ \texttt{member}(\mathrm{YP}[\textsc{subj}\ \langle\boxed{3}_{\boxed{1}}\rangle],\boxed{0})) \rightarrow (\boxed{2} = \boxed{3} \leftrightarrow \boxed{0} = \langle\boxed{2},\ldots\rangle)\end{array}$$

Note that this principle, similar to the ban on grammatical object control in Russian in the LFG analysis of Neidle (1982, 1988), has a similar effect of not allowing (immediate) raising to object in Polish (on the assumption that raising always involves structure-sharing; cf. the RAISING PRINCIPLE (5.444)). That is, according to the CONTROL PRINCIPLE, Polish does not (and cannot) have verbs like the hypothetical verb *brabruje* below, whose object would be structure-shared with the subject of the lower verb.

(5.446) *Janek *brabruje* go być miłym / miłego.
John *brabres* him$_{acc}$ be$_{inf}$ nice$_{ins}$ / nice$_{acc}$

[169] See §5.4.2.4, though, for the possibility of a slightly different analysis.

[170] In standard HPSG this is ensured by the Raising Principle (Pollard and Sag, 1994, pp.140, 403). However, in our analysis Pollard and Sag's (1994) Raising Principle must be abandoned both for empirical reasons (it contradicts the possibility of subject control being analysed as structure-sharing of *synsems*) and for technical reasons (it cannot be immediately formalized in the logic for HPSG assumed throughout this study, i.e., King (1989, 1994) with extensions in Richter *et al.* (1999) and Richter (1999b)). See (5.444) for the weakened version of the Raising Principle, valid for Polish.

[171] Again, we ignore here the difference between *synsem* and *arg*.

'John *brabres* him to be nice.' (cf. English *believes*)

This prediction is indeed correct. On the other hand, this principle does not forbid 'raising to object across a preposition' (see the discussion around (5.406) on p.214) because the ARG-ST of verbs involving such raising does not contain an element YP whose SUBJECT would be coindexed with another element of this ARG-ST.

5.4.2.3 Other Cases of Control

One potential problem with principle (5.445) is, however, caused by secondary predicates predicating of a non-subject argument of a verb, e.g., (5.358) repeated below (see §5.4.1.1 above for other examples).

(5.358) Pamiętam go miłym / miłego.
remember$_{1st,sg}$ him$_{acc}$ nice$_{ins}$ / nice$_{acc}$
'I remember him as nice.'

If, as implicitly assumed in this Chapter, such predicative APs (and NPs) are present on the ARG-ST of the verb, and if their subject is raised to the object position of the verb, then they seem to directly contradict our CONTROL PRINCIPLE (5.445).

We will be able to deal with this apparent problem only after we explicate our approach to modification, namely, in §10.2.3. As we will see there, both the RAISING PRINCIPLE and the CONTROL PRINCIPLE will have to be (trivially) restricted to true (subcategorized) arguments only.

Another potential problem is provided by the contrast between the verb *udawać* 'pretend', whose predicative complement is assigned case via the CASE PRINCIPLE, as we saw in §5.4.1.2 (examples (5.375)–(5.377)), the verb *czuć się* 'feel', whose predicative complement agrees with the subject:

(5.447) Janek udaje głodnego / *głodny.
John$_{nom}$ pretends hungry$_{acc}$ / hungry$_{nom}$
'John pretends to be hungry.'

(5.448) Janek czuje się głodny / ?*głodnym / *głodnego.
John$_{nom}$ feels RM hungry$_{nom}$ / hungry$_{ins}$ / hungry$_{acc}$
'John feels hungry.'

Semantically, both verbs are control verbs; in both the subject is assigned a role by the verb (roughly, agent in case of *udaje* and experiencer in case of *czuje się*). Thus, our analysis seems to predict that subjects of both predicative complements should be marked as [RAISED −], i.e., that both complements should receive case via the CASE PRINCIPLE. However, as the examples above show, only the complement of *udaje* is subject to the CASE PRINCIPLE, while the complement of *czuje się* receives case through agreement with the subject.[172]

[172] This is confirmed by the fact that, when the subject of *czuć się* is a numeral phrase, the case of the complement changes to the accusative/genitive:

Now that we have seen that control may be syntactically realized either via structure-sharing or just through co-indexing, such facts are not particularly problematic for our analysis. Although, as we saw above, in case of control into infinitival complements, subject control is always realized via raising while object control is always realized via co-indexing, this correlation apparently breaks down in other cases of control, such as those involving predicative adjectives in (5.447)–(5.448). So, while both *udaje* and *czuje się* are semantically control ('equi') verbs, the former triggers co-indexing, while the latter involves full structure-sharing. We assume that such idiosyncrasies are specified in lexical entries of these control verbs. One way of ensuring that would be to posit the following (partial) lexical entries for *udaje* and *czuje się*:[173]

(5.449) *udaje*:

$$\left[\begin{array}{ll} \multicolumn{2}{l}{\textit{word}} \\ \text{ARG-ST} & \langle \text{NP}_{\boxed{1}},\ (\text{AP}\vee\text{NP})[\text{SUBJ}\ \langle \text{NP}_{\boxed{1}}\rangle]{:}\boxed{2}\rangle \\ \text{CONT} & \left[\begin{array}{ll} \multicolumn{2}{l}{\textit{pretend}} \\ \text{PRETENDER} & \boxed{1} \\ \text{SOA-ARG} & \boxed{2} \end{array}\right] \end{array}\right]$$

(5.450) *czuje się*:

$$\left[\begin{array}{ll} \multicolumn{2}{l}{\textit{word}} \\ \text{ARG-ST} & \langle \boxed{0}\text{NP}_{\boxed{1}},\ (\text{AP}\vee\text{NP})[\text{SUBJ}\ \langle \boxed{0}\text{NP}\rangle]{:}\boxed{2}\rangle \\ \text{CONT} & \left[\begin{array}{ll} \multicolumn{2}{l}{\textit{feel}} \\ \text{FEELER} & \boxed{1} \\ \text{SOA-ARG} & \boxed{2} \end{array}\right] \end{array}\right]$$

In view of the behaviour of verbs such as *udawać* 'pretend', which realise subject control via co-indexing, we need to constrain our CONTROL PRINCIPLE to control into verbal complements:

(5.451) CONTROL PRINCIPLE (Polish):

$$\begin{array}{l} ([\ \text{ARG-ST}\ \boxed{0}\ ] \wedge \\ \texttt{member}(\boxed{2}\text{XP}_{\boxed{1}},\boxed{0}) \wedge \\ \texttt{member}(\text{YP}[\textit{verb},\ \text{SUBJ}\ \langle \boxed{3}_{\boxed{1}}\rangle],\boxed{0})) \rightarrow (\boxed{2} = \boxed{3} \leftrightarrow \boxed{0} = \langle \boxed{2}, \ldots \rangle) \end{array}$$

5.4.2.4 Distance Effects on Case (Non-)Agreement

Before we conclude this section, a note on what Comrie (1974) calls 'cohesion' is in order. Consider the judgements below.

(5.452) a. Jan jest szczęśliwy / (?)*szczęśliwym.
John$_{nom}$ is happy$_{nom}$ / happy$_{ins}$

(i) Pięciu facetów czuło się głodnych / głodnymi / *głodni.
five$_{acc}$ guys$_{gen}$ felt$_{3rd,sg,neut}$ RM hungry$_{acc/gen}$ / hungry$_{ins}$ / hungry$_{nom}$
'Five guys felt hungry.'

See §5.4.3 for an analysis of predication of numeral phrases.

[173] Additionally, the possibility of *accidental* full structure-sharing in case of *udaje* may be blocked, e.g., by specifying the subject of the AP/NP predicate as [CASE *caseless*]. Note that blocking such 'accidental structure-sharings' is a general HPSG problem, surfacing in many situations.

'John is happy.'

b. Jan chce być szczęśliwy / ?*szczęśliwym.
John$_{nom}$ wants be$_{inf}$ happy$_{nom}$ / happy$_{ins}$
'John wants to be happy.'

c. Jan chce spróbować być szczęśliwy / ?szczęśliwym.
John$_{nom}$ wants try$_{inf}$ be$_{inf}$ happy$_{nom}$ / happy$_{ins}$
'John wants to try to be happy.'

d. Jan bał się nawet chcieć spróbować być szczęsliwy / szczęśliwym.
John$_{nom}$ feared RM even want$_{inf}$ try$_{inf}$ be$_{inf}$ happy$_{nom}$ / happy$_{ins}$
'John was afraid to even want to try to be happy.'

(5.453) a. Jan wydaje się szczęśliwy / ?*szczęśliwym.
John$_{nom}$ seems RM happy$_{nom}$ / happy$_{ins}$
'John seems happy.'

b. Jan chce wydawać się szczęśliwy / ?szczęśliwym.
John$_{nom}$ wants seem$_{inf}$ RM happy$_{nom}$ / happy$_{ins}$
'John wants to seem happy.'

c. Jan chce spróbować wydawać się ?szczęśliwy / szczęśliwym.
John$_{nom}$ wants try$_{inf}$ seem$_{inf}$ RM happy$_{nom}$ / happy$_{ins}$
'John wants to try to seem happy.'

d. Jan bał się nawet chcieć spróbować wydawać się ??szczęsliwy /
John$_{nom}$ feared RM even want$_{inf}$ try$_{inf}$ seem$_{inf}$ RM happy$_{nom}$ /
szczęśliwym.
happy$_{ins}$
'John was afraid to even want to try to seem happy.'

As these examples show, the greater the structural distance between the overt subject and the predicative adjective, the greater the felicity of the adjective in the instrumental case. How should we deal with such increasing felicity of instrumental predicates?

One option is to relegate the analysis to the pragmatic component of the grammar: Recall that syntax (i.e., our PREDICATIVE CASE (NON-)AGREEMENT principle (5.409)) allows in principle both case agreement between the predicate and the subject, and instrumental case on the predicate, with the former option being usually strongly preferred to the latter possibility. If so, then we could get away with the data above by saying that the possibility of the instrumental predicate has been predicted all along, but whatever constraint blocks it when the predicate occurs close to the subject, is relaxed when the predicate AP occurs far from it.

A more contentful hypothesis would be that, although in cases of subject control full structure-sharing of *synsems* is possible, it is not necessary, i.e., just as in Icelandic (5.441)–(5.442), either structure-sharing or just coindexing is possible; this would require a trivial modification of the CONTROL PRINCIPLE (5.445):

(5.445′) CONTROL PRINCIPLE (Polish; a possible revision):

$([\ \text{ARG-ST}\ \boxed{0}\ ] \wedge$

$$\texttt{member}(\boxed{2}\mathrm{XP}_{\boxed{1}},\boxed{0}) \wedge$$
$$\texttt{member}(\mathrm{YP}[\textit{verb}, \text{SUBJ } \langle \boxed{3}_{\boxed{1}} \rangle],\boxed{0})) \rightarrow (\boxed{2} = \boxed{3} \rightarrow \boxed{0} = \langle \boxed{2}, \ldots \rangle)$$

Assuming that structure-sharing is the preferred option, the facts above follow: the greater the number of intervening verbs, the greater the chance that the raising chain will be broken.[174]

However, this latter analysis would predict that no similar 'cohesion' effects should occur in raising, on the assumption that raising always involves structure-sharing of *synsem*s. This prediction is false; compare (5.453) above with (5.454)

(5.454) Jan mógł zacząć wydawać się szczęśliwy / szczęśliwym.
John$_{nom}$ could start$_{inf}$ seem RM happy$_{nom}$ / happy$_{ins}$
'It was possible that John started to seem happy.'

Thus, either the latter analysis in terms of optional structure-sharing in subject control is wrong, or the assumption that, in Polish, raising always involves structure-sharing of *synsem*s should be abandoned.

Trying to resolve this question would lead us too far afield, so we have to stop here.[175]

5.4.3 Predication and Numeral Phrases

Finally, in this section, we will deal with the difficult (and unanalysed so far) problem of predication of numeral phrases. The problem is similar to, but much more difficult to analyse than, that concerning modification of numeral phrases by attributive adjectives, considered in §5.3.1.1 in the context of showing that numerals phrases in subject positions bear the accusative case; see examples (5.260)–(5.261), repeated below.[176]

(5.260) a. Czekało$_{3rd,sg,neut}$ mnie mordercze pięć dni.
awaited me$_{acc}$ murderous$_{acc}$ five$_{acc}$ days$_{gen}$

[174]This can be viewed from the probability angle: if the probability of structure-sharing across a single subject control (as in (5.452b)) is, say, 0.8 (and the probability of co-indexing without sharing of *synsems* is 0.2), then the probability of structure-sharing across two subject control verbs (as in (5.452c)) is 0.64 (and that of no structure-sharing is 0.36), across three such verbs — 0.512 (0.488, respectively), across four — 0.4096 (0.5904), etc. Of course, such considerations are outside the scope of contemporary HPSG qua logical formalism or linguistic theory, which does not allow to talk about probabilities, but there are computationally-oriented probabilistic approaches to HPSG-like formalisms, e.g., Brew (1993), Eisele (1994) and Abney (1996).

[175]Another alternative would be to capitalize on the possibility of optional raising of all arguments in such control and raising ('Verb Clusters') environments, argued for in §§5.2.3.3–5.2.3.4 above: it could be said that predicates, whose subject is not realized locally, are always instrumental, and the possibility of case agreement is the result of this optional raising which allows the predicate to raise to the matrix verb, from which the subject of this predicate is realized. Since raising is optional, the greater the distance between the predicate and the overt subject, the smaller the probability that the predicate raises all the way up to the matrix verb. However, such an analysis would make a number of incorrect predictions, including the one that negation should block such 'long-distance agreement', contrary to, e.g., (i):

(i) Janek próbował nie być niegrzeczny.
John$_{nom}$ tried NM be$_{inf}$ impolite$_{nom}$
'John tried not to be impolite.'

[176]Given the analysis of §5.3.1, we mark the numeral as accusative here and below.

‘Five hectic days awaited me.’

b. Czekało$_{3rd,sg,neut}$ mnie morderczych pięć dni.
awaited me$_{acc}$ murderous$_{gen}$ five$_{acc}$ days$_{gen}$
‘Five hectic days awaited me.’

(5.261) a. Znowu przyszło te pięć kobiet.
again came$_{3rd,sg,neut}$ these$_{acc}$ five$_{acc}$ women$_{gen}$
‘These five women came again.’

b. Znowu przyszło tych pięć kobiet.
again came$_{3rd,sg,neut}$ these$_{gen}$ five$_{acc}$ women$_{gen}$
‘These five women came again.’

Such facts, although rather idiosyncratic, can be analysed within GB by saying that the so-called ‘prequantifier’ (adjective in (5.260), pronoun in (5.261)) may either modify the whole numeral phrase (and occur in the accusative) or it may modify the NP argument of the numeral (and occur in the genitive), but be moved to the pre-numeral position (Rutkowski, 1999). This can be easily formalized in HPSG by positing linear precedence constraints allowing modifiers of NPs to be phonologically realized before the numeral. Another way of dealing with such data is to assume that the numeral assigns the genitive (of quantification) to all elements within a certain domain, but the prequantifier may move out of this domain before this genitive of quantification is assigned (Franks 1994b, p.653; Franks 1995, p.133) or simply be (optionally) realized outside this domain in the first place (Babby, 1987, 1988).

5.4.3.1 Numeral Phrases and Case Agreement

Neither of the analyses of attributive modification of numeral phrases mentioned above carries over to similar facts involving predicative modifiers and exemplified in (5.455)–(5.458).[177]

(5.455) a. Kilka drzew było wyrwane z ziemi.
a few$_{acc}$ trees$_{gen}$ be$_{3rd,sg,neut}$ torn$_{acc}$ from earth
‘A few trees were uprooted.’

b. Kilka drzew było wyrwanych z ziemi.
a few$_{acc}$ trees$_{gen}$ be$_{3rd,sg,neut}$ torn$_{gen}$ from earth
‘A few trees were uprooted.’

(5.456) a. Te pięć kobiet wydawało się bardzo miłe.
these$_{acc}$ five$_{acc}$ women$_{gen}$ seemed$_{3rd,sg,neut}$ RM very nice$_{acc}$
‘These five women seemed very nice.’

b. Tych pięć kobiet wydawało się bardzo miłych.
these$_{gen}$ five$_{acc}$ women$_{gen}$ seemed$_{3rd,sg,neut}$ RM very nice$_{gen}$
‘These five women seemed very nice.’

[177] (5.458) is from Kopcińska (1997, p.48), but morphosyntactic markings are ours. (5.457) was uttered by the newscaster of the *Panorama* TV news on 27th July 1999.

(5.457)

Pierwsze	sześć	samolotów	zostanie	zakupione	we	wrześniu.	
first$_{acc}$	six$_{acc}$	airplanes$_{gen}$	Aux$_{fut}$	bought$_{acc}$	in	September	

'The first six planes will be bought in September.'

(5.458) a.

Siedem	ręczników	zostało	wyprane.
seven$_{acc}$	towels$_{gen}$	Aux$_{3rd,sg,neut}$	washed$_{acc}$

'Seven towels were washed.'

b.

Siedem	ręczników	zostało	wypranych.
seven$_{acc}$	towels$_{gen}$	Aux$_{3rd,sg,neut}$	washed$_{gen}$

'Seven towels were washed.'

The problem with those potential analyses of attributive modification of numeral phrases is that they assume that one of the possibilities (accusative for Rutkowski (1999), genitive for Franks (1994b, 1995)) reflects the standard position of an adjective (or, more generally, prequantifier), while the other possibility is the result of movement of the prequantifier out of a position in the numeral phrase (movement of a genitive prequantifier out of the embedded NP for Rutkowski (1999), of movement of an accusative prequantifier out of the domain of the numeral for Franks (1994b, 1995)). If these analyses were to be extended to predicative modification as in (5.455)–(5.458), however, they would have to involve *lowering* of the prequantifier from a subject-internal position to the predicative argument of the verb, which would violate a number of GB assumptions, and would be untenable in view of the well-known differences between attributive and predicative modification. Similarly, it is not clear how the analysis of Babby (1987, 1988), according to which prequantifiers are base-generated either in a position c-commanded by the numeral (and receive the genitive case), or outside this c-command domain (and receive the case of the numeral), might be extended to predicative facts, short of claiming that the complement of the copula is optionally c-commanded by the numeral in the subject of the copula.[178]

Below, we present an HPSG analysis of such predicative modification of numeral phrases.

5.4.3.2 An HPSG Analysis

Facts such as (5.455)–(5.458) are problematic for any syntactic framework, including HPSG; according to the standard HPSG assumptions, the genitive case marking on the predicative AP should not be possible. The reason for that is that, in HPSG, agreement between a predicate and the predicated phrase is analysed as agreement between the predicate and the *synsem*s on its SUBJ list. This is so also in our PREDICATIVE CASE (NON-)AGREEMENT (5.409), repeated below:

(5.409) PREDICATIVE CASE (NON-)AGREEMENT (third version; repeated):

$$\begin{bmatrix} \text{VAL}|\text{SUBJ } \langle \text{XP}^{+}[\text{CASE } \boxed{1}]\rangle \\ \text{HEAD}|\text{CASE } \boxed{2} \end{bmatrix} \rightarrow (\boxed{1} = \boxed{2}) \vee (\boxed{1} = \mathit{str} \wedge \boxed{2} = \mathit{lins})$$

[178] To the best of our knowledge, the problem has not even been noticed in the generative literature so far; e.g., Franks (1998b, fn.6, p.143), and earlier Franks (1995, pp.278–279), seems to assume that the predicative adjective must always be genitive.

If so, then, according to standard HPSG assumptions again, there is no way the predicative AP (or NP) may agree with an argument of its subject; the SUBJ list contains only *synsems* (or *arguments*), without any information about the constituent tree structure of this subject, and with VALENCE lists of this subject empty. In other words, the predicate has no access to information about arguments of its subject.

There are three possible approaches to this problem:

- either the genitive case on the predicate has nothing to do with the genitive case on the argument of the numeral,
- or the case agreement between the predicate and its subject should be reanalysed in configurational terms,
- or information about arguments of the numeral should be accessible to the predicate.

We immediately reject the second alternative as drastically departing from standard assumptions of HPSG when other, less drastic measures (namely, the other two alternatives) are available.

As to the first alternative, its most plausible instantiation would be that it is the [NUM +] feature that is responsible for the genitive case on the predicate, i.e., that the PREDICATIVE CASE (NON-)AGREEMENT should be modified along the following lines:

(5.459) PREDICATIVE CASE (NON-)AGREEMENT (fourth version; tentative):

$$\begin{bmatrix} \text{VAL}|\text{SUBJ } \langle \text{XP}^{+}\begin{bmatrix} \text{CASE } \boxed{1} \\ \text{NUM } \boxed{0} \end{bmatrix}\rangle \\ \text{HEAD}|\text{CASE } \boxed{2} \end{bmatrix} \rightarrow$$

$$(\boxed{1} = \boxed{2}) \vee (\boxed{1} = \textit{str} \wedge \boxed{2} = \textit{lins}) \vee (\boxed{0} = \text{`+'} \wedge \boxed{2} = \textit{gen})$$

This modification would also account for the accusative / genitive variation in case when the predicated phrase is an accusative object, as in (5.460), but it would wrongly predict the possibility of the genitive case when the numeral phrase is, say, dative, cf. (5.461).

(5.460) Janek widział (te/tych) pięć kobiet nagie / nagich.
John$_{nom}$ saw these$_{acc,gen}$ five$_{acc}$ women$_{gen}$ naked$_{acc}$ / naked$_{gen}$
'John saw (these) five women naked.'

(5.461) Janek pomagał (tym/*tych) pięciu kobietom nagim / *nagich.
John$_{nom}$ helped these$_{dat,*gen}$ five$_{dat}$ women$_{dat}$ naked$_{dat}$ / naked$_{gen}$
'John helped (these) five women (when they were) naked.'

This means that (5.459) would have to be strengthened to the effect that only accusative numerals may be predicated of by genitive APs:

(5.462) PREDICATIVE CASE (NON-)AGREEMENT (fifth version; tentative):

$$\begin{bmatrix} \textsc{val}|\textsc{subj}\ \langle \text{XP}^{+}\begin{bmatrix}\textsc{case}\ \boxed{1} \\ \textsc{num}\ \boxed{0}\end{bmatrix}\rangle \\ \textsc{head}|\textsc{case}\ \boxed{2}\end{bmatrix} \rightarrow$$
$$(\boxed{1} = \boxed{2}) \vee (\boxed{1} = \mathit{str} \wedge \boxed{2} = \mathit{lins}) \vee (\boxed{1} = \mathit{acc} \wedge \boxed{0} = \text{`+'} \wedge \boxed{2} = \mathit{gen})$$

Turning to the third alternative, one simple way of making the information about the numeral's arguments accessible to the predicate is to make ARG-ST a head feature. Although it is often assumed (Miller and Sag, 1997; Abeillé *et al.*, 1998b; Bouma *et al.*, 1999b) that ARG-ST is present only on *word*s, never on *phrase*s, as this is supposed to lead to more restrictive grammars, there is some evidence that having ARG-ST on all projections is useful, if not necessary. One argument was given in §5.4.1.2 (see discussion around (5.406) on p.214), where it was suggested that some semantically raising verbs, such as *uważać* 'consider', need access to arguments of their prepositional complements. Another argument is provided by the kind of data discussed by Meurers (1999b) (see §4.4.2), who assumes that all elements of SUBCAT of a word are present on all projections of this word. Other works assuming the presence of ARG-ST (or the complete SUBCAT) on all projections include Grover (1995) (on the grounds of getting rid of last traces of configurationality in the HPSG binding theory; see pp.18–19), Frank (1994) (to deal with verb second in German), Frank and Reyle (1995, 1996) (to 'cope with scrambling and scope' in German), and Baxter (1999b) (to analyse purpose infinitives in English).

It seems, thus, that making ARG-ST a head feature has enough independent justification to seriously consider it here. With this modification of HPSG feature geometry, we could revise our PREDICATIVE CASE (NON-)AGREEMENT principle as follows:

(5.463) PREDICATIVE CASE (NON-)AGREEMENT (sixth version; tentative):

$$\begin{bmatrix} \textsc{val}|\textsc{subj}\ \langle \text{XP}^{+}\begin{bmatrix}\textsc{case}\ \boxed{1} \\ \textsc{arg-st}\ \boxed{3} \\ \textsc{num}\ \boxed{0}\end{bmatrix}\rangle \\ \textsc{head}|\textsc{case}\ \boxed{2}\end{bmatrix} \rightarrow$$
$$(\boxed{1} = \boxed{2}) \vee (\boxed{1} = \mathit{str} \wedge \boxed{2} = \mathit{lins}) \vee (\boxed{3} = \langle[\textsc{case}\ \boxed{2}], \ldots\rangle \wedge \boxed{0} = \text{`+'})$$

Now, which version of the PREDICATIVE CASE (NON-)AGREEMENT principle should we choose: (5.462), reflecting the 'idiosyncratic genitive' option, or (5.463), realizing the 'agreement with an embedded NP' alternative?

Note that both analyses correctly deal with the data in (5.455)–(5.458); on the analysis of (5.462) the genitive is the result of direct assignment, while, according to (5.463), it is the result of agreement with the first element on the numeral's ARG-ST. Similarly, both analyses account for the data in (5.460)–(5.461); contrary to what might be thought on first blush, the analysis in (5.463) does not lead to spurious ambiguities when a predicative AP modifies a dative numeral phrase, as in (5.461). Although, according to (5.463), the dative case on the predicate may be either the result of agreement with the numeral (see the first disjunct in the consequent of (5.463)) or with the NP argument of the numeral (see the third disjunct in (5.463)), the resulting structures are identical: in both instances, the CASE value of the predicate is structure-shared with the CASE value of the numeral, which is in turn structure-shared with the CASE value of the NP argument of the numeral (see the lexical entry (5.304) on p.186).

Are there, then, no empirical arguments for choosing between these two alternatives? Fortunately, there is an empirical argument, although somewhat stipulative. Recall example (5.325) (repeated below) from Buttler *et al.* (1971), showing a tendency to assimilate paucal numerals to *pięć*-type numerals:

(5.325) %Cztery tygodnie minęło.
four$_{acc}$ weeks$_{acc}$ passed$_{3rd,sg,neut}$
'Four weeks passed.'

Although such examples are often deemed ungrammatical in written Polish, they do occur in spoken Polish; cf., e.g., the attested (5.327) on p.193. We cited this example as showing that there is no strong correlation between the [NUM +] specification on a nominal element (here, *cztery* 'four') in subject position, and the requirement that the argument of this element be genitive; *tygodnie* clearly is not genitive.

Now, to the extent that (5.325) is acceptable, also (5.464) is acceptable:

(5.464) %(Te) cztery tygodnie było mordercze.
these$_{acc}$ four$_{acc}$ weeks$_{acc}$ was$_{3rd,sg,neut}$ murderous$_{acc}$
'These four days were murderous.'

This is, indeed, predicted by both analyses. However, the 'idiosyncratic genitive' analysis in (5.462), but not the 'agreement with embedded NP' analysis in (5.463), would also predict the possibility of genitive marking on the predicate. This prediction is false; there is a clear grammaticality drop from (5.464) to (5.465).[179]

(5.465) *(Tych) cztery tygodnie było morderczych.
these$_{gen}$ four$_{acc}$ weeks$_{acc}$ was$_{3rd,sg,neut}$ murderous$_{gen}$
'These four days were murderous.' (intended)

Thus, the contrast between (5.464)–(5.465) provides an empirical argument for the analysis in (5.463), and against (5.462).

Another advantage of the analysis in (5.463) over that in (5.462) is that it allows to maintain the generalization that the instrumental is the only non-agreeing case of predication in Polish, i.e., that the genitive on the predicative AP is the result of case agreement, just as the accusative, although it agrees not with the head of the numeral phrase, but with the subject of this phrase. For these reasons, we will settle for the analysis essentially as in (5.463).

However, before we give the final version of the PREDICATIVE CASE (NON-)AGREEMENT principle, we introduce one minor modification in order to make the account compatible with *attributive* modification, as in (5.260)–(5.261) (see p.233). As these examples show, attributive adjectives display similar instability with respect to case agreement as predicative adjectives: when they modify an accusative numeral phrase, they may occur either in the accusative, or

[179]This grammaticality drop is even more striking as, in examples such as (5.455)–(5.458), native speakers of Polish usually prefer the genitive to the accusative case on the predicative (or attributive) modifier.

in the genitive case (but not in the instrumental; this possibility is restricted to predication). This means that the first and the third disjunct of the consequent of (5.463) should be grouped into a 'case agreement relation', holding between the *case* of the modifier, whether attributive or predicative, and the *head* of the modified phrase. Such relation, formulated with RSRL (Richter, 1997, 1999b; Richter *et al.*, 1999) in mind, is given below:

(5.466) $\texttt{case-agreement(}\boxed{1}\mathit{case}\texttt{, }\boxed{2}\mathit{head}\texttt{)} \leftrightarrow (\boxed{2} = [\text{CASE } \boxed{1}] \vee \boxed{2} = \begin{bmatrix} \text{ARG-ST } \langle[\text{CASE } \boxed{1}], \ldots\rangle \\ \text{NUM } + \end{bmatrix})$

With this relation, the principle of case agreement in attributive modification may be formulated as in (5.467)...

(5.467) ATTRIBUTIVE CASE AGREEMENT:

$$\begin{bmatrix} \mathit{head} \\ \text{CASE } \boxed{1} \\ \text{MOD}|\text{LOC}|\text{CAT}|\text{HEAD } \boxed{2}[\text{CASE } \boxed{0}] \end{bmatrix} \rightarrow \texttt{case-agreement(}\boxed{1}\texttt{, }\boxed{2}\texttt{)}$$

...while the final version of the PREDICATIVE CASE (NON-)AGREEMENT principle may be formalized as below:

(5.468) PREDICATIVE CASE (NON-)AGREEMENT (final version):

$$\begin{bmatrix} \text{VAL}|\text{SUBJ } \langle \text{XP}^{+}[\text{ HEAD } \boxed{3}[\text{CASE } \boxed{1}]\ ] \\ \text{HEAD}|\text{CASE } \boxed{2} \end{bmatrix} \rightarrow$$
$$\texttt{case-agreement(}\boxed{2}\texttt{, }\boxed{3}\texttt{)} \vee (\boxed{1} = \mathit{str} \wedge \boxed{2} = \mathit{lins})$$

Before we conclude this subsection, we should ask ourselves whether there are any deeper reasons for numeral phrases, but not other kinds of phrases, being modifiable by a predicate agreeing either with the head or with the subject of the phrase. We believe that the reason has to do with the fact that numeral phrases seem to be the only kinds of phrases in which the head and the subject bear the same *index*, if not the whole CONTENT values.

How do we know the numeral and the noun bear the same *index*? First, although it is clear that the noun bears an *index*, it is perhaps less clear that the numeral has an *index*, too. That this is indeed so is shown by examples such as (5.257)–(5.258), repeated below, in which a numeral phrase binds a reflexive anaphor; this shows that the whole numeral phrase must bear an *index*.

(5.257) Pięciu facetów zobaczyło siebie samych w lustrze.
five guys$_{gen}$ saw$_{3rd,sg,neut}$ Self Emph$_{pl,masc}$ in mirror
'Five guys saw themselves in a mirror.'

(5.258) Pięć kobiet zobaczyło siebie same w lustrze.
five women$_{gen}$ saw$_{3rd,sg,neut}$ Self Emph$_{pl,fem}$ in mirror
'Five women saw themselves in a mirror.'

But since the numeral phrase is headed by a numeral, its CONTENT is that of the numeral, so the numeral must also bear an *index*. Another, even more clear, argument for the claim that the numeral (phrase) bears an *index* comes from the considerations of the semantics of the verb; if the verb assigns a semantic role to its subject's *index* when the subject is a garden variety NP, it should also assign a role to its subject's *index*, when the subject is a numeral phrase.

Moreover, as the markings on the emphatic element *samych/same* in (5.257)–(5.258) show, this *index* is plural, just as that of the noun, and its gender correlates with that of the noun.

This means that the numeral bears an *index* which agrees with the *index* of the noun. So, since the numeral and the noun seem to refer to the same entity, namely a set of objects, whose nature is described by the noun and whose cardinality is determined by the numeral, it makes sense to assume that these *indices* (and perhaps even whole CONTENT values) are actually structure-shared.[180]

This situation, in which a head and its argument share *indices* seems to be unparalleled; for example, in (5.469), the head and its argument refer to different entities, so they cannot share their *indices* and, accordingly, a (predicative) modifier may agree only with the head, as shown in (5.470).

(5.469) książka Chomsky'ego
book Chomsky$_{gen}$
'Chomsky's (author/owner) book'

(5.470) Książka Chomsky'ego była gruba / *grubego.
book$_{nom}$ Chomsky$_{gen}$ was thick$_{nom}$ / thick$_{gen}$
'Chomsky's book was thick.'

Interestingly, also constructions such as (5.471), which, as discussed in §5.3.1.3 (cf. p.183), are similar to numeral phrases in exhibiting the mixed government/agreement characteristics, do not allow their (predicative) modifiers to agree in case with the argument, cf. (5.472).

(5.471) a. coś miłego
something$_{nom}$ nice$_{gen}$
'something nice'

b. czemuś miłemu / *miłego
something$_{dat}$ nice$_{dat}$ / nice$_{gen}$
'(for/to) something nice'

(5.472) Coś nieoczekiwanego byłoby mile widziane / *widzinego.
something$_{nom}$ unexpected$_{gen}$ would be nicely seen$_{nom}$ / seen$_{gen}$
'Something unexpected would be well received.'

[180]This assumption is perhaps surprising from a semantic point of view; after all, numerals have quantificational force, so it seems that their CONTENT should be of type *quant*, rather than *nom-obj*, as assumed here. However, in Chapter 9 (§9.3; cf. also Przepiórkowski (1998a, 1997c)) we present an HPSG theory of quantification which builds and crucially improves on Pollard and Yoo (1998) (itself a clear improvement on the standard (Pollard and Sag, 1994, ch.8) HPSG theory of quantification), and which allows quantifiers to be introduced by items with any type of CONTENT, including *nom-obj*.

This is as expected because adjectives do not share their CONTENTs with nouns they modify; in fact, adopting the analysis of Kasper (1997), all adjectives have CONTENT of type *psoa*, so an adjective does not have an *index* in its CONTENT at all.

Thus, it seems that numeral phrases are indeed the only phrases in which the head and an argument share *indices* (or, perhaps, CONTENT values), so this property may be held responsible for the agreeing patterns they enter. Although this intuition could be explicated in the PREDICATIVE CASE (NON-)AGREEMENT principle, we see no particularly good empirical arguments supporting it, so we remain content with the technically correct, although perhaps conceptually incomplete, principle (5.468).

5.4.3.3 A Note on an (Im)Possible Alternative

The facts concerning case agreement with numeral phrases, and the resulting analysis presented above, are so unprecedented as to raise some doubts about the correctness of our analysis of the structure of Polish numeral phrases in §5.3.1.2; perhaps there is an analysis which does not necessitate looking at arguments of numeral phrases in order to determine the case of the modifier? This is the question we will briefly consider in this subsection.

Note first that the analysis of case agreement above does not crucially depend on our analysis of numeral phrases as headed by the numeral. If we chose the opposite stance, i.e., numeral phrases as headed by the nouns, the problem would be exactly the same: the modifier either would agree with the genitive head of the phrase, or it would have to look into the phrase in order to agree with the accusative numeral.

Interestingly, also the (rather wild) analysis of numeral phrases as consistently ambiguous between the two options, i.e., between being headed by the numeral and being headed by the noun, is untenable. Such an analysis would assume that, whenever the modifier occurs in the accusative case, the numeral phrase is headed by the accusative numeral, and when it occurs in the genitive, the numeral phrase is headed by the genitive noun. This would nicely account for all cases of attributive and predicative modification considered so far, but it would be helpless in case of *simultaneous* attributive and predicative modification in which one modifier occurs in the accusative and the other is genitive. The relevant examples are (5.473), tentatively considered by Kopcińska (1997, p.51) as grammatical.[181]

(5.473) a. ?Leniwe siedem kotów było śpiących.
lazy$_{acc}$ seven$_{acc}$ cats$_{gen}$ be$_{3rd,sg,neut}$ sleepy$_{gen}$
'Seven lazy cats were sleepy.'

b. ?Leniwych siedem kotów było śpiące.
lazy$_{gen}$ seven$_{acc}$ cats$_{gen}$ be$_{3rd,sg,neut}$ sleepy$_{acc}$
'Seven lazy cats were sleepy.'

Another example, which to our ears sounds more acceptable than (5.473), is given below:

[181] Morphosyntactic case markings are ours; recall that Kopcińska (1997) considers numeral phrases in subject positions to be nominative, a position we gave strong arguments against in §5.3.1.1.

(5.474) a. Tych pięć domów zostało zburzone wczoraj.
these$_{gen}$ five$_{acc}$ houses$_{gen}$ Aux$_{3rd,sg,neut}$ destroyed$_{acc}$ yesterday
'These five houses were destroyed yesterday.'

b. Te pięć domów zostało zburzonych wczoraj.
these$_{acc}$ five$_{acc}$ houses$_{gen}$ Aux$_{3rd,sg,neut}$ destroyed$_{gen}$ yesterday.
'These five houses were destroyed yesterday.'

Thus, neither the analysis of numeral phrases as headed by the (non-numeral) noun, nor the analysis positing a systematic ambiguity between the two structures, can deal with case agreement between a numeral phrase and its (attributive or predicative) modifier without positing agreement with an argument inside such a phrase.[182]

5.4.3.4 Numeral Phrases and Instrumental Predicates

In this subsection, we will look at distance effects on case (non-)agreement in subject control environments when the subject is a numeral phrase.

We noted above that instrumental is often strongly dispreferred as the case of a predicative adjective; in particular, it is close to being fully ungrammatical as the case of adjectival complement of the predicative copula. We also noted that in cases of subject control, the instrumental gradually improves with increasing distance from the subject; cf. (5.452)–(5.453) repeated below:

(5.452) a. Jan jest szczęśliwy / (?)*szczęśliwym.
John$_{nom}$ is happy$_{nom}$ / happy$_{ins}$
'John is happy.'

b. Jan chce być szczęśliwy / ?*szczęśliwym.
John$_{nom}$ wants be$_{inf}$ happy$_{nom}$ / happy$_{ins}$
'John wants to be happy.'

c. Jan chce spróbować być szczęśliwy / ?szczęśliwym.
John$_{nom}$ wants try$_{inf}$ be$_{inf}$ happy$_{nom}$ / happy$_{ins}$
'John wants to try to be happy.'

d. Jan bał się nawet chcieć spróbować być szczęsliwy / szczęśliwym.
John$_{nom}$ feared RM even want$_{inf}$ try$_{inf}$ be$_{inf}$ happy$_{nom}$ / happy$_{ins}$
'John was afraid to even want to try to be happy.'

(5.453) a. Jan wydaje się szczęśliwy / ?*szczęśliwym.
John$_{nom}$ seems RM happy$_{nom}$ / happy$_{ins}$
'John seems happy.'

b. Jan chce wydawać się szczęśliwy / ?szczęśliwym.
John$_{nom}$ wants seem$_{inf}$ RM happy$_{nom}$ / happy$_{ins}$

[182] One more possibility would be to consider numeral phrases as, in some sense, bi-headed, i.e., simultaneously headed by the numeral and the noun. It is not clear how such an idea could be realized in HPSG, so we leave this possibility for future research.

'John wants to seem happy.'

c. Jan chce spróbować wydawać się ?szczęśliwy / szczęśliwym.
John$_{nom}$ wants try$_{inf}$ seem$_{inf}$ RM happy$_{nom}$ / happy$_{ins}$
'John wants to try to seem happy.'

d. Jan bał się nawet chcieć spróbować wydawać się ??szczęsliwy / szczęśliwym.
John$_{nom}$ feared RM even want$_{inf}$ try$_{inf}$ seem$_{inf}$ RM happy$_{nom}$ / happy$_{ins}$
'John was afraid to even want to try to seem happy.'

Interestingly, this improvement is much quicker and clearer when the subject is a numeral phrase:

(5.475) a. Wiele studentek jest szczęśliwych / ?szczęśliwe / ?*szczęśliwymi.
many$_{acc}$ students$_{gen,pl,fem}$ be$_{3rd,sg,neut}$ happy$_{gen}$ / happy$_{acc}$ / happy$_{ins}$
'Many students$_{fem}$ are happy.'

b. Wiele studentek chce być szczęśliwych / ??szczęśliwe / ?szczęśliwymi.
many$_{acc}$ students$_{gen,pl,fem}$ want$_{3rd,sg,neut}$ be$_{inf}$ happy$_{gen}$ / happy$_{acc}$ / happy$_{ins}$
'Many students$_{fem}$ want to be happy.'

c. Wiele studentek chce spróbować być ?szczęśliwych / ??szczęśliwe / szczęśliwymi.
many$_{acc}$ students$_{gen,pl,fem}$ want$_{3rd,sg,neut}$ try$_{inf}$ be$_{inf}$ happy$_{gen}$ / happy$_{acc}$ / happy$_{ins}$
'Many students$_{fem}$ want to try to be happy.'

d. Wiele studentek bało się nawet chcieć spróbować być ??szczęsliwych / ???szczęśliwe / szczęśliwymi.
many$_{acc}$ students$_{gen,pl,fem}$ feared$_{3rd,sg,neut}$ RM even want$_{inf}$ try$_{inf}$ be$_{inf}$ happy$_{gen}$ / happy$_{acc}$ / happy$_{ins}$
'Many students$_{fem}$ were afraid to even want to try to be happy.'

(5.476) a. Wiele studentek wydaje się szczęśliwych / ?szczęśliwe / ?szczęśliwymi.
many$_{acc}$ students$_{gen,pl,fem}$ seem$_{3rd,sg,neut}$ RM happy$_{gen}$ / happy$_{acc}$ / happy$_{ins}$
'Many students$_{fem}$ seem happy.'

b. Wiele studentek chce wydawać się ?szczęśliwych / ??szczęśliwe / szczęśliwymi.
many$_{acc}$ students$_{gen,pl,fem}$ want$_{3rd,sg,neut}$ seem$_{inf}$ RM happy$_{gen}$ / happy$_{acc}$ / happy$_{ins}$

'Many students$_{fem}$ want to seem happy.'

c. Wiele studentek chce spróbować wydawać się
many$_{acc}$ students$_{gen,pl,fem}$ want$_{3rd,sg,neut}$ try$_{inf}$ seem$_{inf}$ RM
??szczęśliwych / ???szczęśliwe / szczęśliwymi.
happy$_{gen}$ / happy$_{acc}$ / happy$_{ins}$
'Many students$_{fem}$ want to try to seem happy.'

d. Wiele studentek bało się nawet chcieć spróbować
many$_{acc}$ students$_{gen,pl,fem}$ feared$_{3rd,sg,neut}$ RM even want$_{inf}$ try$_{inf}$
wydawać się ???szczęsliwych / ???szczęśliwe / szczęśliwymi.
seem$_{inf}$ RM happy$_{gen}$ / happy$_{acc}$ / happy$_{ins}$
'Many students$_{fem}$ were afraid to even want to try to seem happy.'

Unlike in case of non-numeral subjects (5.452)–(5.453), the instrumental predicative AP is as acceptable as the agreeing predicative AP already in cases of just one interevening verb, as in (5.475b), and in case of *wydawać się* 'seem', even without any intervening verbs, cf. (5.476a).[183] When more subject control verbs intervene between the subject and the predicative AP, the instrumental case quickly becomes preferable to the agreeing genitive and accusative cases.

Similar situation occurs when we consider true raising verbs, cf., e.g., (5.477):

(5.477) Wiele studentek wydawało się być miłych / ?miłe / (?)miłymi.
many$_{acc}$ students$_{gen,pl,fem}$ seem$_{3rd,sg,neut}$ RM be$_{inf}$ nice$_{gen}$ / nice$_{acc}$ / nice$_{ins}$
'Many students$_{fem}$ seemed to be nice.'

Here, the instrumental is fully acceptable to most speakers we consulted. However, if we accept the analysis of raising as always involving full structure-sharing of *synsem*s (see the discussion in §5.4.2.4), then the subject of the copula *być* is obligatorily structure-shared with the matrix subject, i.e., the instrumental cannot be explained away by saying that the copula in (5.477) takes a PRO subject.

Such data refute claims that the copula cannot combine with an instrumental predicative AP; it can, although it often prefers the case-agreeing predicate. This preference depends on a number of factors, including the distance between the subject and the predicate, and whether the subject is numeral or not. In cases like (5.452a) above, involving a non-numeral subject and no intervening verbs, the nominative case is so strongly preferred that it virtually excludes the instrumental, while in (5.477) and in (5.475b–d) the instrumental is fully acceptable, and sometimes even clearly preferred.

5.4.4 Summary of Case Assignment and Predication

In this section, we have dealt with case assignment to and case agreement of predicative case-bearing phrases.

[183] There is a slight variation among speakers in judging examples (5.475)–(5.476), but the general tendency seems to be uniform for all native speakers of Polish.

Perhaps the most important result of this section is delimiting the domain of the CASE PRINCIPLE, i.e., determining which arguments receive their case via assignment, and which through agreement. Surprisingly, the expectation that it is exactly predicative arguments that receive case via agreement turned out to be imprecise and we argued instead that case-bearing predicates agree with their subjects only when these subjects are raised to the immediately higher ARG-ST. Otherwise, they are assigned case just like other, fully saturated, NPs and APs. In this respect, the account developed here is empirically superior to accounts linking case agreement directly to predication (cf., e.g., Yip *et al.* (1987, §8), Leko (1989, §3.3), and Bratt (1990, p.11)), but also theoretically superior to those analyses which claim that it is a matter of idiosyncratic lexical stipulation which dependents of a verb get their case via general assignment rules, and which through case agreement (as in Müller (1998b,a)).

We also argued that, contrary to common assumptions, syntax should allow case-bearing predicates to occur in the instrumental case whenever they modify a structural NP, although in concrete cases this possibility may be severely restricted. Then we investigated the nature of PRO and suggested that it bears a structural case which is never morphologically realized; for this reason we called this case *caseless*. We saw that this assumption leads to a correct analysis of PRO as being modifiable only by instrumental predicates.

Then we looked into interaction of control and case assignment/agreement, and we saw that Polish patterns with Icelandic and Ancient Greek in providing evidence for two different syntactic reflexes of control: object control involves only co-indexing, in line with standard assumptions about control in HPSG, while subject control involves full structure-sharing of *synsem*s, as assumed in LFG.

Finally, we turned back to numeral phrases and investigated the unprecedented case behaviour of modifiers of such numeral phrases, which may agree either with the numeral phrase or with its NP argument. This phenomenon, apparently difficult to analyse within GB, turned out to be easy to account within HPSG, but required modifying a standard HPSG assumption that ARG-ST is present on *word*s only.

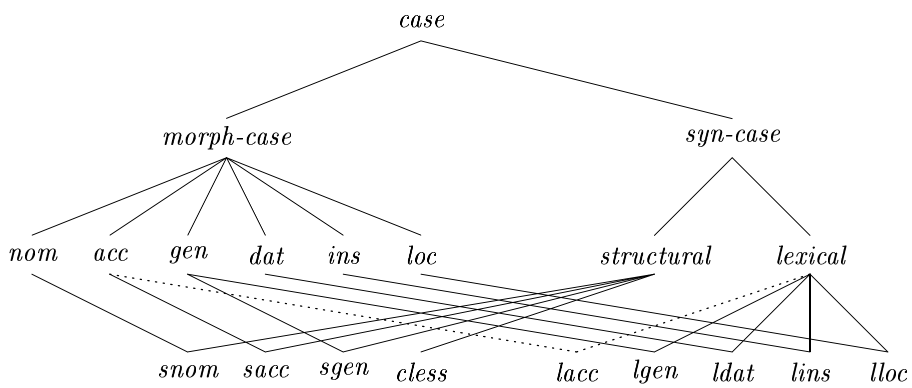
Various parts of our analysis of syntactic case in Polish, scattered throughout this and previous sections, are collected in the concluding section §5.5 below.

5.5 Conclusions

We devoted this rather long Chapter to considerations of various syntactic aspects of case assignment and case agreement in Polish and saw that the non-configurational approach to case assignment developed in the previous Chapter is directly applicable to these often ill-behaved facts. In this rather brief section, we collect various parts of the final analysis.

First, the final case hierarchy for Polish is repeated below:

(5.421)



All maximal subtypes of *morph-case*, i.e., *snom*, *sacc*, *sgen*, (*lacc*,) *lgen*, *ldat*, *lins*, and *lloc*, but crucially not *caseless*, may appear as CASE values of full *signs*:

(5.422) $$\begin{bmatrix} \textit{sign} \\ \text{SS}|\ldots|\text{CASE } \boxed{1} \end{bmatrix} \rightarrow \boxed{1} = \textit{morph-case}$$

Now, CASE PRINCIPLE FOR POLISH assigns case only to 'Complete Functional Complexes', i.e., to case-bearing elements which, as postulated in the previous Chapter, are [RAISED −], but—in addition—whose unrealized subject (if any) is also [RAISED −]:

(5.381) $$\text{CFC} \stackrel{\text{df}}{=} \begin{bmatrix} \textit{arg} \\ \text{ARG XP}\begin{bmatrix}\text{SUBJ list}(\begin{bmatrix} \textit{arg} \\ \text{ARG YP} \\ \text{RAISED } - \end{bmatrix})\end{bmatrix} \\ \text{RAISED } - \end{bmatrix}$$

The final version of CASE PRINCIPLE FOR POLISH developed in this Chapter consists of the following constraints:

(5.423) $$\begin{bmatrix} \textit{category} \\ \text{HEAD } \textit{verb}\neg[\textit{fin}] \\ \text{ARG-ST } \langle\text{CFC}[\text{CASE } \textit{str}]\rangle\oplus\boxed{1} \end{bmatrix} \rightarrow \begin{bmatrix}\text{ARG-ST } \langle[\text{CASE } \textit{cless}]\rangle\oplus\boxed{1}\end{bmatrix}$$

(5.424) $$\begin{bmatrix} \textit{category} \\ \text{HEAD } \textit{verb}[\textit{fin}] \\ \text{ARG-ST } \langle\text{CFC}\begin{bmatrix}\text{CASE } \textit{str} \\ \text{NUM } -\end{bmatrix}\rangle\oplus\boxed{1} \end{bmatrix} \rightarrow \begin{bmatrix}\text{ARG-ST } \langle[\text{CASE } \textit{snom}]\rangle\oplus\boxed{1}\end{bmatrix}$$

(5.425) $$\begin{bmatrix} \textit{category} \\ \text{HEAD } \textit{verb}[\textit{fin}] \\ \text{ARG-ST } \langle\text{CFC}\begin{bmatrix}\text{CASE } \textit{str} \\ \text{NUM } +\end{bmatrix}\rangle\oplus\boxed{1} \end{bmatrix} \rightarrow \begin{bmatrix}\text{ARG-ST } \langle[\text{CASE } \textit{sacc}]\rangle\oplus\boxed{1}\end{bmatrix}$$

(5.384) $$\begin{bmatrix} \textit{category} \\ \text{HEAD } \begin{bmatrix}\textit{verb} \\ \text{NEG } -\end{bmatrix} \\ \text{ARG-ST } \boxed{1}_{\textit{nelist}}\oplus\langle\text{CFC}[\text{CASE } \textit{str}]\rangle\oplus\boxed{2}_{\textit{list}} \end{bmatrix} \rightarrow \begin{bmatrix}\text{ARG-ST } \boxed{1}\oplus\langle[\text{CASE } \textit{sacc}]\rangle\oplus\boxed{2}\end{bmatrix}$$

(5.385) $$\begin{bmatrix} \textit{category} \\ \textsc{head} \begin{bmatrix} \textit{verb} \\ \textsc{neg}\ + \end{bmatrix} \\ \textsc{arg-st}\ \boxed{1}_{\textit{nelist}} \oplus \langle \mathrm{CFC}[\textsc{case}\ \textit{str}] \rangle \oplus \boxed{2}_{\textit{list}} \end{bmatrix} \rightarrow \begin{bmatrix} \textsc{arg-st}\ \boxed{1} \oplus \langle [\textsc{case}\ \textit{sgen}] \rangle \oplus \boxed{2} \end{bmatrix}$$

(5.386) $$\begin{bmatrix} \textit{category} \\ \textsc{head}\ \textit{prep} \\ \textsc{arg-st}\ \langle \mathrm{CFC}[\textsc{case}\ \textit{str}] \rangle \end{bmatrix} \rightarrow \begin{bmatrix} \textsc{arg-st}\ \langle [\textsc{case}\ \textit{sacc}] \rangle \end{bmatrix}$$

This is by no means a complete theory of structural case assignment in Polish: it does not say anything about ad-nominal arguments, it does not take into consideration partitive arguments discussed in §5.1.9, and also (5.386) needs to be (trivially) modified to deal with predicative prepositions, whose ARG-ST is of length 2. Nevertheless, the version of the CASE PRINCIPLE FOR POLISH developed in this Chapter is relatively comprehensive as it deals with a variety of case phenomena in Polish and interacts with other such phenomena.[184]

Not all case-bearing phrases receive their case via assignment; some receive it via agreement. We defined case agreement in (5.466)...

(5.466) $$\texttt{case-agreement}(\boxed{1}\textit{case},\ \boxed{2}\textit{head}) \leftrightarrow \left(\boxed{2} = [\textsc{case}\ \boxed{1}] \lor \boxed{2} = \begin{bmatrix} \textsc{arg-st}\ \langle [\textsc{case}\ \boxed{1}], \ldots \rangle \\ \textsc{num}\ + \end{bmatrix}\right)$$

...suggested in passing a principle of attributive case agreement...

(5.467) ATTRIBUTIVE CASE AGREEMENT:

$$\begin{bmatrix} \textit{head} \\ \textsc{case}\ \boxed{1} \\ \textsc{mod}|\textsc{loc}|\textsc{cat}|\textsc{head}\ \boxed{2}[\textsc{case}\ \boxed{0}] \end{bmatrix} \rightarrow \texttt{case-agreement}(\boxed{1},\ \boxed{2})$$

...and developed a principle of predicative case agreement:

(5.468) PREDICATIVE CASE (NON-)AGREEMENT:

$$\begin{bmatrix} \textsc{val}|\textsc{subj}\ \langle \mathrm{XP}^{+}\begin{bmatrix} \textsc{head}\ \boxed{3}[\textsc{case}\ \boxed{1}] \end{bmatrix} \rangle \\ \textsc{head}|\textsc{case}\ \boxed{2} \end{bmatrix} \rightarrow$$
$$\texttt{case-agreement}(\boxed{2},\ \boxed{3}) \lor (\boxed{1} = \textit{str} \land \boxed{2} = \textit{lins})$$

Examining the interaction of control and case assignment/agreement, we argued that, in Polish, subject control into verbal complements is syntactically realized via structure-sharing of *synsems*, just like raising, while object control involves only co-indexation. We captured this observation in CONTROL PRINCIPLE (5.451), and weakened the RAISING PRINCIPLE for Polish (without formalizing it).

(5.451) CONTROL PRINCIPLE (Polish):

$$\begin{aligned} &(\begin{bmatrix} \textsc{arg-st}\ \boxed{0} \end{bmatrix} \land \\ &\texttt{member}(\boxed{2}\mathrm{XP}_{\boxed{1}}, \boxed{0}) \land \\ &\texttt{member}(\mathrm{YP}[\textit{verb},\ \textsc{subj}\ \langle \boxed{3}_{\boxed{1}} \rangle], \boxed{0})) \rightarrow (\boxed{2} = \boxed{3} \leftrightarrow \boxed{0} = \langle \boxed{2}, \ldots \rangle) \end{aligned}$$

[184] To the best of our knowledge, it is the most comprehensive formal theory of syntactic case in Polish proposed in linguistic literature so far.

(5.444) RAISING PRINCIPLE (Polish):

> If an element of a *word*'s ARG-ST is not assigned a role in this *word*'s CONTENT, then its *synsem* must be structure-shared with the *synsem* of some element of a lower ARG-ST.

Moving to more ephemeral issues, we investigated 'long distance Genitive of Negation' and argued that it is not 'long distance' at all, but rather the result of optional raising of arguments of lower verbs in Polish 'Verb Clusters' (control and raising verbal environments) to argument structures of higher verbs. We discussed a number of ways of formalizing this optional raising, but did not fully develop any of them, as this task would require a careful investigation of a number of 'clause union' phenomena in Polish and, thus, is outside the scope of this study. Nevertheless, we argued that verbal negation blocks this optional raising, just as it seems to block 'restructuring' in Italian:

(5.210) NO RAISING ACROSS NEGATION:

$$\begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} \\ \text{NEG} \; + \end{bmatrix} \\ \text{ARG-ST} & \langle \boxed{0} \rangle \oplus \boxed{1} \end{bmatrix} \rightarrow \boxed{1} = \text{list}(\text{XP}^{-})$$

Finally, we carefully analysed the structure of Polish numeral phrases, infamous for their quirky behaviour. We argued that they are headed by numerals, a subtype of nouns, and that their NP arguments are really their subjects. As such, they pattern with other non-complement arguments of verbs and nouns in displaying the mixed agreement/government characteristics.

Further, we compared the behaviour and internal structure of various types of numerals and argued that, due to various minimal differences between these different types of numerals, any hope for a general syntactic account of this quirky internal structure must be abandoned. Instead, we developed a lexicalist analysis of Polish numerals which derives this behaviour from their lexical properties. Thus, partial lexical entries of *pięć*-type are given in (5.303)–(5.304).

$$(5.303) \quad \begin{bmatrix} \textit{word} & \\ \text{SS|LOC|CAT} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{noun} \\ \text{CASE} \; \textit{str} \\ \text{NUM} \; + \end{bmatrix} \\ \text{VAL|SUBJ} & \langle \text{NP}[\textit{lgen}] \rangle \end{bmatrix} \end{bmatrix}$$

$$(5.304) \quad \begin{bmatrix} \textit{word} & \\ \text{SS|LOC|CAT} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{noun} \\ \text{CASE} \; \boxed{1}\textit{lex} \\ \text{NUM} \; + \end{bmatrix} \\ \text{VAL|SUBJ} & \langle \text{NP}[\text{CASE} \; \boxed{1}] \rangle \end{bmatrix} \end{bmatrix}$$

On the other hand, paucal numerals *dwa* 'two', *trzy* 'three' and *cztery* 'four' have lexical entries such as (5.319), which differ from (5.304) only minimally, in value of NUMERAL.

(5.319) $$\begin{bmatrix} \textit{word} & \\ \textsc{ss}|\textsc{loc}|\textsc{cat} & \begin{bmatrix} \textsc{head} & \begin{bmatrix} \textit{noun} \\ \textsc{case}\ \boxed{1} \\ \textsc{num}\ - \end{bmatrix} \\ \textsc{val}|\textsc{subj} & \langle \text{NP}[\textsc{case}\ \boxed{1}]\rangle \end{bmatrix} \end{bmatrix}$$

Moreover, virile paucal numerals have the additional option of adhering to (5.303).

Another class of numerals, such as *dużo* 'a lot' and *trochę* 'a little', have only the entry (5.303), while still another, including, e.g., *tysiąc* 'thousand' and *masę* 'mass', have a lexical entry which is a simple generalization of (5.303):

(5.333) $$\begin{bmatrix} \textit{word} & \\ \textsc{ss}|\textsc{loc}|\textsc{cat} & \begin{bmatrix} \textsc{head} & \begin{bmatrix} \textit{noun} \\ \textsc{num}\ + \end{bmatrix} \\ \textsc{val}|\textsc{subj} & \langle \text{NP}[\textit{lgen}]\rangle \end{bmatrix} \end{bmatrix}$$

Finally, the class of collective numerals displays a pattern between (5.333) and (5.303)–(5.304):

(5.329) $$\begin{bmatrix} \textit{word} & \\ \textsc{ss}|\textsc{loc}|\textsc{cat} & \begin{bmatrix} \textsc{head} & \begin{bmatrix} \textit{noun} \\ \textsc{case}\ \textit{str} \vee \textit{lins} \\ \textsc{num}\ + \end{bmatrix} \\ \textsc{val}|\textsc{subj} & \langle \text{NP}[\textit{lgen}]\rangle \end{bmatrix} \end{bmatrix}$$

(5.330) $$\begin{bmatrix} \textit{word} & \\ \textsc{ss}|\textsc{loc}|\textsc{cat} & \begin{bmatrix} \textsc{head} & \begin{bmatrix} \textit{noun} \\ \textsc{case}\ \boxed{1}(\textit{lex} \wedge \neg\textit{lins}) \\ \textsc{num}\ + \end{bmatrix} \\ \textsc{val}|\textsc{subj} & \langle \text{NP}[\textsc{case}\ \boxed{1}]\rangle \end{bmatrix} \end{bmatrix}$$

All these numerals, apart from paucal numerals described by (5.319), belong to the *syntactic* class of numerals, defined as [NUMERAL +], and having the uniform property of bearing the accusative case in subject position (see clause (5.425)) of the CASE PRINCIPLE). This non-nominative value of CASE, on the other hand, triggers the 'default' 3rd person singular neuter form of the finite verb, in accordance with the VERB AGREEMENT PRINCIPLE developed in Czuba and Przepiórkowski (1995):

(5.313) $$\begin{bmatrix} \textit{word} & \\ \textsc{ss}|\textsc{loc}|\textsc{cat} & \begin{bmatrix} \textsc{head}|\textsc{vform}\ \textit{fin} \\ \textsc{arg-st}\ \neg(\langle[\textsc{case}\ \textit{nom}]\rangle \oplus \boxed{0}) \end{bmatrix} \end{bmatrix} \rightarrow$$

$$\begin{bmatrix} \textsc{ss}|\textsc{loc}|\textsc{cat}|\textsc{head}|\textsc{agr} & \begin{bmatrix} \textsc{person}\ \textit{3rd} \\ \textsc{gender}\ \textit{neut} \\ \textsc{number}\ \textit{sg} \end{bmatrix} \end{bmatrix}$$

(5.314) $$\begin{bmatrix} \textit{word} & \\ \textsc{ss}|\textsc{loc}|\textsc{cat} & \begin{bmatrix} \textsc{head}|\textsc{vform}\ \textit{fin} \\ \textsc{arg-st}\ \langle[\textsc{case}\ \textit{nom}] \begin{bmatrix} \textsc{person}\ \boxed{1} \\ \textsc{gender}\ \boxed{2} \\ \textsc{number}\ \boxed{3} \end{bmatrix}\rangle \oplus \boxed{0} \end{bmatrix} \end{bmatrix} \rightarrow$$

$$\left[\text{SS}|\text{LOC}|\text{CAT}|\text{HEAD}|\text{AGR}\ \begin{bmatrix}\text{PERSON}\ \boxed{1}\\ \text{GENDER}\ \boxed{2}\\ \text{NUMBER}\ \boxed{3}\end{bmatrix}\right]$$

This ends the first contentful Part of this study, whose aim has been to develop a general, modular and principled HPSG theory of syntactic case, and to apply it to a variety of case phenomena in Polish. In the next Part, devoted to investigation of the complement/adjunct dichotomy, we will return (in due course) to certain loose ends concerning case marking of adjuncts.

Part II

The Complement/Adjunct Dichotomy

It is surprising that the adjunct vs. complement dichotomy, one of the most conspicuous in linguistics, is at the same time one of the least understood. There has never been a consistent theory of valency allowing one to divide a predicate's dependents into complements and adjuncts, and yet linguists are eager to build syntactic theories crucially relying on this dichotomy.

In this Part of our study, we critically examine this standard syntactic understanding of the complement/adjunct distinction. First, in Chapter 6, we review various ways of understanding the dichotomy at hand found in different linguistic traditions. In Chapter 7, we deal with probably the best-known, and at the same time most explicit, test for configurational distinction between complements and adjuncts, and show that, since it is based on false assumptions, it cannot do the job it is expected to do. Then, in Chapter 8, we consider various alleged syntactic reflexes of the dichotomy and show that, at a closer look, none of them can be observed in Polish. The results of these two Chapters give us the freedom to analyse the complement/adjunct distinction outside configurational syntax; in Chapter 9, we build on earlier HPSG work concerned with modification and provide a formalization of the dichotomy at hand which places the distinction only at the lexical (or lexico-semantic) level of the grammar. Finally, in Chapter 10, we adduce important evidence for such an approach to modification provided by cross-linguistic case assignment facts, and we tie certain loose ends of the previous Part of this study.

Chapter 6

Previous Approaches to the Complement/Adjunct Dichotomy

This Chapter provides an overview of the most popular ways of understanding the complement/adjunct distinction.[1] First, we look at some criteria used within the Valency Grammar tradition (§6.1), then we take a bird's eye view of the situation in Polish linguistics (§6.2), and move to a more careful characterization of the dichotomy at hand as construed within the P&P (Principles and Parameters) framework (§6.3). We also briefly look at the approaches to the complement/adjunct dichotomy adopted within LFG (§6.4) and in early HPSG (§6.5), postponing the discussion of the more recent HPSG approaches to modification, known as 'Adjuncts-as-Complements' approaches, to Chapter 9.

6.1 Complements vs. Adjuncts: Inconsistent Intuitions

It is important to realize that the theory of valency has been flawed ever since its conception. For example, Tesnière (1959) gives three criteria allegedly distinguishing complements and adjuncts (here summarised after Vater (1978a, p.22)):

(C1) the **morphological-syntactic criterion**: complements are noun phrases, adjuncts are prepositional phrases;

(C2) the **semantic criterion**: complements express the persons or things participating in the process in a special way, whereas adjuncts express the time, the place, the manner, etc. connected with that process;

(C3) the **functional criterion**: complements, unlike adjuncts, are indispensable to complete the meaning of the verb; hence the number of complements, but not adjuncts, is limited for every verb.

Not only is the first criterion far from linguistic intuitions about complements and adjuncts (cf. prepositional complements and bare NP adverbials), but actually the three criteria are

[1] We limit ourselves here to considerations of *verbal* valency.

pairwise incompatible.

Let us consider, for example, the last two criteria. There are well known examples of verbs whose dependents should be classified as complements according to the functional criterion and as adjuncts according to the semantic criterion, e.g., in Polish and English:[2] *zachowywać się* 'behave', *leżeć* 'lie, be situated', *ująć* 'put' (as in *ujmę to następująco* 'let me put it this way'), etc. In all these and more[3] cases, the dependents of the verbs at hand are clearly "indispensable to complete the meaning of the verb" (as well as syntactically obligatory) and they should be analysed as (functional) complements. On the other hand, since these dependents express manner (*zachowywać się*, *ująć*) or place (*leżeć*), rather than "expressing the persons or things participating in the process in a special way," they are clear cases of (semantic) adjuncts.

These shortcomings of Tesnière's theory have been repeatedly acknowledged within the Valency Grammar tradition and numerous attempts to save it have been proposed. Vater (1978a,b) surveys various such attempts made within German linguistics and shows that they are either inherently inconsistent or empirically flawed. Similar conclusion is reached by Somers (1984) ("valency-boundedness is NOT a simple binary feature of arguments with respect to the predicate", p.520), by Sawicki (1988) ("[n]o single criterion for this distinction has been found yet and it is rather doubtful that it can be found in the future", p.17) and, again, by Sadziński (1989) ("[a]lthough attempts [at differentiating between complements and adjuncts] abound, the problem is still not solved satisfactorily",[4] p.48). Reactions to this theoretical backlash against Tesnière's theory of valency ranged from denying the existence of the dichotomy (Vater, 1978a,b), through reformulating it as a many-way distinction reflecting results of various tests (Somers, 1984) or putting forward a complex (and rather arbitrary) algorithm based on a cluster of morphological, syntactic and semantic properties (Sawicki, 1988), to reformulating the theory of valency in dynamic context-sensitive (and hence, in essence, pragmatic) terms (Sadziński, 1989).

Nevertheless, although the morphological-syntactic criterion has fallen into well-deserved disfavour among linguists, the other two criteria are behind most intuitions about the complement/adjunct dichotomy. In fact, we show below that some form of the functional distinction is accepted almost universally, while the semantic distinction is strong in traditional Polish linguistics. As we will see below, much confusion around the notions of *complement* and *adjunct* results from an implicit attempt at conflating these two criteria.

6.2 Polish Linguistics

When Polish grammars make a clear distinction between complements and adjuncts, it usually closely corresponds to the semantic criterion of Tesnière (1959).[5] Thus, Szober (1953, pp.309–310) describes complements (*dopełnienia*) as dependents referring to entities, while adjuncts

[2] These two criteria do not to converge in other languages either.

[3] Many other Polish verbs subcategorizing for adverbial phrases are listed in Świdziński (1994). Contrary to the popular belief, such verbs are textually frequent, cf. Świdziński (1996) for quantitative characteristics.

[4] "Der springende Punkt der Valenztheorie ist die Unterscheidung zwischen Aktanten und Angaben. *Obwohl es an entsprechenden Versuchen nicht fehlt, ist das Problem nach wie vor nicht zufriedenstellend gelöst.*"

[5] The 'when' part is meaningful here; for example, the 604-page grammar of Polish Benni *et al.* (1923) devotes only a very vague half-page to this distinction.

(*okoliczniki*) refer to various circumstances in which the actions and states are placed.[6,7] Also Klemensiewicz *et al.* (1955, p.413) mention that complements refer to a 'thing' (*przedmiot*) that is characterized by the activity or state referred to by the verb.[8] Similar view is expressed, e.g., in Lehr-Splawiński and Kubiński (1952, p.166), Klemensiewicz (1968, p.39), Gołąb *et al.* (1968, p.391), Bartnicka-Dąbkowska *et al.* (1972, pp.193–198), Jodłowski (1976, p.91), Bąk (1984, p.421), Jaworski (1986, pp.157–162), Nagórko (1996, p.197), Labocha (1996, pp.45, 47), Cząstka-Szymon *et al.* (1996, pp.155, 59), Strutyński (1997, pp.310, 312).

Four of these sources (Gołąb *et al.*, 1968; Bąk, 1984; Jaworski, 1986; Nagórko, 1996) show, however, uneasiness with the pure semantic criterion and apply it only to adjuncts; complements are characterized either via the functional criterion (Bąk 1984, p.419, Jaworski 1986, p.157, Nagórko 1996, p.193), or as 'governed by the verb' (Gołąb *et al.*, 1968, p.132), which results in an inconsistent hybrid criterion, intermediate between the semantic criterion and the pure functional criterion.[9]

Finally, the fully-blown functional understanding of the distinction at hand is adopted by more recent Polish grammars: It is implicit in the notion *connotation* (*konotacja*) in Saloni and Świdziński (1985, p.73 and ch.X) (and, earlier, in Saloni 1976) and it is made explicit in Świdziński (1997, p.72).

In summary, the understanding of the complement/adjunct dichotomy accepted in Polish linguistics almost unanimously is that given by the semantic criterion: complements express persons or things participating in the action or state expressed by the verb, while adjuncts express various circumstances of that action or state such as time, place, manner, reason, etc. An exception to this generalization is the functional approach of Saloni and Świdziński. We will see below that this differs from the view inherent in the so-called generative linguistics (of which GB, LFG and HPSG are exemplars), in which it is the functional criterion that is generally accepted.

6.3 Principles and Parameters

Although the complement/adjunct dichotomy is supposed to play a central rôle in the Chomskyan version of generative linguistics, there is no generally agreed upon classification of kinds of dependents, nor is there a generally accepted analysis of adjuncts. The following quotes are typical:

> [T]he exact definition of the boundary separating the two classes of entities [i.e., arguments and adjuncts; A.P.] and the way to integrate the distinction within the

[6] "Dopełnieniem lub obiektem nazywamy takie określenie, które wskazuje na przedmiot... Okolicznikiem nazywamy określenia wskazujące na najrozmaitsze stosunki, wśród jakich odbywają się czynności i stany..."

[7] Admittedly, this is a simplification: traditional grammars distinguish between three types of dependents (*określenia*): 'objects' or 'complements' (*dopełnienia*), 'adverbials' or 'circumstantials' (*okoliczniki*), and 'attributes' (*przydawki*). Since we are interested in verbal dependents only, we ignore here the distinction between adverbials and attributes, and call them adjuncts.

[8] "Funkcja dopełnienia polega na tym, że wymienia ono w rzeczowniku lub w innej części mowy w roli rzeczownika *przedmiot*, którego dotyczy czynność lub stan, nazwane w nadrzędnym składniowo przymiotniku..."

[9] Some of the more recent sources explicitly acknowledge the difficulty of finding a strict criterion for distinguishing complements from adjuncts, e.g., Nagórko (1996, p.193) and Polański (1993, p.367).

> theory are still quite controversial.
>
> (Rizzi, 1990, p.72)

> It is interesting to note that the notions of "argument" and "non-argument", although widely used, presently have no commonly-accepted definitions. Indeed, they cannot be given formal definitions within the "Principles and Parameters" theory (Chomsky 1992), which provides only a restricted set of X-bar structural positions...
>
> (Fowler and Yadroff, 1993, p.252, fn.3)

> The notion "argument" has an intuitively clear content, though the boundaries of the concept are not only not agreed upon, but seldom discussed.
>
> (Williams, 1995, p.100)

> [W]e still have no good phrase structure theory for such simple matters as attributive adjectives, relative clauses, and adjuncts of many different types.
>
> (Chomsky, 1995b, p.382, n.22)

Nevertheless, it is taken for granted that some such distinction exists in the syntax and, in particular, that configurational differences between arguments and adjuncts explain various apparent differences in their behaviour with respect to, e.g., extraction and case assignment.

In the four subsections below, we will examine the understanding of the dichotomy at hand offered by various textbooks (§6.3.1), see how this distinction was employed in the 1980's version of the Government and Binding theory (§6.3.2), look at the ensuing transfer of emphasis from argumenthood/adjuncthood to referentiality (§6.3.3), and briefly consider the Minimalist approach (§6.3.4).

6.3.1 Textbooks

6.3.1.1 Intuitions

Despite various ways of understanding the complement/adjunct dichotomy, works dealing with or building on this distinction hardly ever make clear which of them is assumed. The situation is somewhat clearer at the textbook level. The emerging picture is that the intuition behind the complement/adjunct distinction most often invoked within the P&P framework is a syntactic version of the functional criterion (cf. (C3) on p.255):

(C3′) the **syntactic-functional criterion**: complements tend to be obligatory, adjuncts are always optional.

This is made explicit in, e.g., Radford (1988) and Borsley (1991, 1999a), and it is alluded to in Haegeman (1994):

> Complements tend to be (though are not always) *obligatory*, whereas Adjuncts are *always optional*.
>
> (Radford, 1988, p.236)

> [C]omplements tend to be obligatory, whereas adjuncts are always optional.
>
> (Borsley, 1991, p.62)

> In the traditional literature on parsing, optional constituents such as the PPs in (8a) and (9) are called adjuncts.
>
> (Haegeman, 1994, p.40)

Another popular criterion is the co-occurrence restriction:

> An important difference between complements and adjuncts is that complements are associated with specific lexical heads in a way that adjuncts are not. More precisely, particular lexical heads co-occur with particular complements, whereas an adjunct of a particular type is generally possible in any phrase of a particular kind whatever the head is.
>
> (Borsley, 1991, p.62)[10]

> In the case of a PP Complement, there are severe restrictions on the choice of P heading the PP; particular Nouns require...a PP introduced by a particular Preposition... By contrast the type of PP which functions as an Adjunct can be used to modify *any* type of head Noun...
>
> (Radford, 1988, p.192)

Other tests, most extensively discussed in Radford (1988), include: relative ordering of complements and adjuncts (Radford, 1988, pp.177, 235–236, 244, 255), semantic differences (Radford, 1988, pp.188, 233), iterability (cf. (C4) on p.267 below and Radford 1988, p.189), coordination (Radford, 1988, p.190), and postposing and preposing (Radford, 1988, pp.191, 235).

In the interest of brevity, we will not discuss these tests here. It is interesting to note, though, that none of them appears in Radford (1997). Somewhat surprisingly, Radford (1997) does not invoke the syntactic-functional criterion (C3′) either and, instead, retreats to the more traditional semantic criterion:[11]

> A traditional distinction is drawn between arguments (which are expressions which typically denote the participants in the activity or event described by a verb) and adjuncts (which are expressions providing additional information about the relevant activity/event, e.g. its location, the time at which it took place, the manner in which it took place, etc.).
>
> (Radford, 1997, p.142)

This seems to be a result of the increased awareness within the Principle and Parameters theory of the lack of a coherent understanding of the dichotomy at hand.

[10] See also Borsley (1999a).

[11] See also Radford (1997, p.325).

6.3.1.2 Representations

Linguistic textbooks written within the Principles and Parameters tradition present an exceptionally clear understanding of the complement/adjunct dichotomy in terms of X′-theory (Chomsky, 1970). According to this view, most fully articulated in Jackendoff (1977), adjuncts occupy different configurational positions than complements. More specifically, within the general X′-scheme in (6.1), complements are the YPs introduced by the rule (6.1c), while adjuncts are the YPs in (6.1b):

(6.1) a. $X'' \rightarrow (YP)\ X'$ (YP = specifier)

b. $X' \rightarrow X'\ YP$ (YP = adjunct)

c. $X' \rightarrow X\ YP^*$ (YP = complement)

In other words, complements are sisters of heads (Xs) and daughters of X′s, adjuncts are sisters and daughters of X′s, while specifiers are sisters of X′s and daughters of X″s (Radford 1988, p.176 and ch.5; Borsley 1991, pp.62–63; Haegeman 1994, pp.91–94; Radford 1997, pp.142–144; Borsley 1999a).

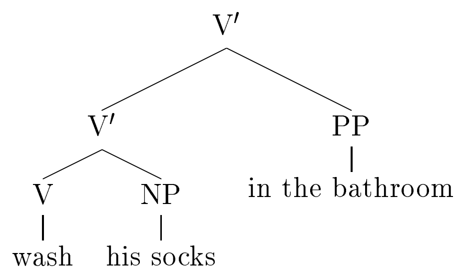
This configurational difference between complements and adjuncts is held responsible for a number of phenomena (see §6.3.2 below). One of them, to be discussed in considerable detail in Chapter 7, is the so-called *do so* substitution: it is assumed that *do so* can substitute any V′, that is, a verb with all its complements and possibly some adjuncts (Radford 1988, p.234; Borsley 1991, p.62, from which the examples below are drawn; and Haegeman 1994, pp.88–92):

(6.2) a. Stefan will wash his socks in the bathroom and Ben will do so in the kitchen.

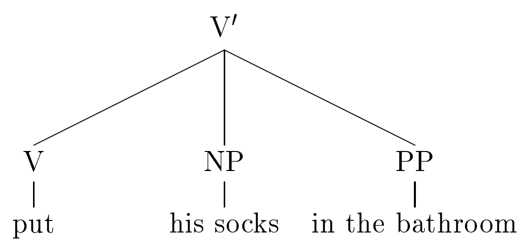
b. *Stefan will put his socks in the bathroom and Ben will do so in the kitchen.

The grammaticality of (6.2a) and the ungrammaticality of (6.2b) follow from this assumption: since, according to the X′-theory (6.1), sentences (6.2a)–(6.2b) correspond to the trees (6.3a)–(6.3b), respectively, *wash his socks* can be replaced by *do so* because it constitutes a V′, while *put his socks* cannot because it is only a proper part of the smallest V′.

(6.3) a.



b.



Perhaps more crucially, structural differences between complements and adjuncts are also the basis of the GB theory of extraction. This is the issue to which we turn in the next subsection.

6.3.2 Government and Binding in the 1980's

Although the idea that there is some configurational distinction between complements and adjuncts is well entrenched in the P&P framework, there is much controversy about what exactly the tree-configurational position of adjuncts should be. It is rather telling that later expositions of the X′-theory do not mention adjuncts at all (e.g., Chomsky 1986b, pp.2–4; Webelhuth 1995b) or are inconsistent in this respect (e.g., Roberts 1997, pp.19, 21, 24, treats adjuncts ('modifiers') as specifiers, but later, pp.200–201, 207, 251, assumes that they are adjoined to VP). Whatever the assumptions of particular works, the simple picture of §6.3.1.2 is rarely, if ever, respected. For example, Chomsky (1986b) (and earlier Huang (1982)) analyses adjuncts as generated outside VP, specifically, as sisters of I′; Pollock (1989) assumes they are adjoined to AgrP ('sentence adverbs') or to VP ('VP-adverbs'); and for Rizzi (1990) reason adverbials are adjoined to TP, while manner adverbials are adjoined to VP.

Nevertheless, whatever the exact position of adjuncts, it is always assumed to be fundamentally different from the position of complements; since Huang (1982), this difference is held responsible for the apparent differences in the behaviour of extraction of and from these two classes of dependents.

Huang (1982) based his analysis on Chomsky's (1981) proposal to account for the long-distance extraction differences between complements and subjects (6.4) via the Empty Category Principle (6.5).

(6.4) a. ??What$_i$ did you wonder why I bought $\_\__i$?

b. *Who$_i$ did you wonder why $\_\__i$ bought this book?

(6.5) Empty Category Principle (ECP):

An empty category must be properly governed.

(6.6) A properly governs B iff either A lexically/theta governs B or A antecedent governs B.[12]

(6.7) A governs B iff, for all maximal projections X, X dominates A iff X dominates B.

(6.8) A lexically governs B iff A is a lexical head and A governs B.

(6.9) A theta governs B iff A assigns θ-role to B and A governs B.

(6.10) A antecedent governs B iff A binds B and A governs B.

(6.11) A binds B iff A c-commands B, and A and B are co-indexed.

(6.12) A c-commands B iff A does not dominate B and every branching node dominating A dominates B.

[12]The version of the ECP relying on lexical government was formulated in Chomsky (1981), the version relying on theta government — in Stowell (1981).

(6.4b) is ungrammatical because it violates ECP: the trace of *who* is not lexically governed (because the subject is outside the VP), nor is it antecedent governed (*Who*, the only element binding the trace, does not govern it). On the other hand, the trace of the object in (6.4a) is lexically governed, so it satisfies the ECP; its relatively mild ungrammaticality results from an independent principle, i.e., Subjacency.

Huang (1982) was the first to observe that long-distance adjunct extraction patterns with subject extraction, not with complement extraction:

(6.13) a. ??What$_i$ did you wonder why I bought $\_\__i$?

b. *Why$_i$ did you wonder what I bought $\_\__i$?

He argues that the contrast in (6.13) follows from ECP just as that in (6.4) does: since the adjunct is not lexically governed (it is outside the VP; this is where the configurational difference between complements and adjuncts plays a crucial rôle), it must be antecedent governed, but the only binding category is *why*, which is too far to govern the trace.

Huang (1982) was also the first to notice that movement out of adjuncts gives worse results than movement out of complements. In fact, he assumed that movement out of adjuncts is always impossible and proposed to account for that via his Condition on Extraction Domain (note analogy to the ECP in (6.5)):

(6.14) Condition on Extraction Domain (CED):
No constituent may be extracted out of a domain which is not properly governed.

CED was held responsible for contrasts such as (6.15) below:

(6.15) a. What$_i$ was Mary hoping [that Peter would explain $\_\__i$]?

b. *What$_i$ was Mary bothered [because Peter explained $\_\__i$]?

Again, the configurational difference between complements and adjuncts is crucial here: extracting *what* out of the clause *that Peter would explain what* is possible because, being a complement in (6.15a), it is properly governed by the verb *hoping*. On the other hand, the clause *because Peter explained what* is an adjunct in (6.15b), i.e., it is outside the VP headed by *bothered* and, hence, is not properly governed.

Although, in view of examples (6.16)[13] (from Chomsky 1982, Chomsky 1986b, p.66, Cinque 1990, p.101, and Manzini 1992, p.29, respectively) involving apparently grammatical extraction out of adjuncts, CED cannot be maintained, ECP has long been assumed to be fundamentally correct in predicting extraction differences between complements and adjuncts. In the following section we will see that this assumption is unjustified.

[13]See Cinque (1990, p.101), Pollard and Sag (1994, p.183), Hukari and Levine (1994, p.295) and Bouma *et al.* (1999b, §5) for other examples of this kind.

(6.16) a. Here is the influential professor$_i$ that John went to college [in order to impress $\_\_{}_i$].

b. He is the person who$_i$ they left [before speaking to $\_\_{}_i$] / [before meeting $\_\_{}_i$].

c. This is the man$_i$ John went away [without saying goodbye to $\_\_{}_i$].

d. What$_i$ did Peter leave [after explaining $\_\_{}_i$]?

6.3.3 Complements/Adjuncts and Referentiality

6.3.3.1 Rizzi (1990) and Cinque (1990)

Early 1990's witnessed certain shift of emphasis from complement/adjunct dichotomy-based accounts of extraction to ones based on referentiality. For example, Rizzi (1990), building on earlier work by Joseph Aoun and Guglielmo Cinque, says:

> [T]he concise characterization of the fundamental generalization that fits the facts discussed best is...: referential elements are (marginally) extractable from islands, nonreferential elements are not.
>
> (Rizzi, 1990, p.85)

This conclusion is based on the fact that adverbials and measure phrases (as well as idiom chunks) which are lexically selected, i.e., which are complements, behave on par with typical adjuncts with respect to extraction from *wh*-islands. For example, extraction of the adverbial complement of *behave* in (6.17a) is as ungrammatical as extraction of the adjunct in (6.17b), and, similarly, extraction of the measure phrase in (6.18) gives rise to strong ungrammaticality, contrary to what the version of ECP given above predicts.

(6.17) a. *How$_i$ do you wonder with whom$_j$ to behave $\_\_{}_i$ $\_\_{}_j$?

b. *How$_i$ do you wonder which problem$_j$ John could solve $\_\_{}_j$ $\_\_{}_i$?

(6.18) ?/*What did John wonder how to weigh?

(Subjacency-kind ungrammaticality on the agentive reading, strong ungrammaticality on the measure reading.)

Rizzi (1990) argues that what distinguishes the adverbial complement of *behave* and the measure complement of *weigh* (as well as idiom chunks) from typical complements is that they are non-referential, with the notion of referentiality left at the intuitive level:

> Whatever precise definition of "referential" we will end up adopting, it is intuitively plausible that compositional complements should turn out to be referential in a sense in which nominal parts of idioms... are not; similarly, it makes intuitive sense to say that the direct object of agentive weigh and the comitative complement of *behave* are referential whereas the measure phrase selected by stative *weigh* and the manner adverbial selected by *behave* are not...
>
> (Rizzi, 1990, p.85)

Rizzi (1990) then moves on to characterize referential expressions (*arguments*) as being assigned a referential θ-role, as opposed to non-referential complements, assigned a non-referential θ-role (*quasi-arguments*):[14]

> Some selected elements refer to participants in the event described by the verb (John, apples, books, etc.); other selected elements do not refer to participants but rather qualify the event (compositionally (measure, manner, etc.) or idiosyncratically (idiom chunks)). This split corresponds, in essence, to Chomsky's (1981, p. 325) distinction between *arguments* (referential expressions potentially referring to participants in the event) and *quasi-arguments* (expressions that receive a θ-role but do not refer to a participant, such as the subject of atmospheric predicates and the nominal parts of idioms.
>
> (Rizzi, 1990, p.86)

The third class of dependents are non-arguments, i.e., adjuncts.

This notion of referentiality is refined in Cinque (1990), who says that:

> only those [phrases] can be long *Wh*-Moved that are used strictly referentially — in other words, that refer to specific members of a preestablished set. This characterization recalls Pesetsky's (1987) important notion of D(iscourse)-linking...
>
> (Cinque, 1990, p.8)

and further notes that:

> [a] phenomenon that discriminates between referential and nonreferential phrases is *coreference.*
>
> (Cinque, 1990, p.8)

Now the facts in (6.17)–(6.18) are predicted once the 'lexical/theta government' disjunct in the definition of proper government (6.6) is replaced by 'referential theta-marking':[15] both (6.17a) and (6.17b) involve long-distance extraction of an element which is not referentially theta marked (in case of (6.17b) it is not theta marked at all). Similarly, since only the agentive *weigh* assigns referential θ-role to its complement, the facts in (6.18) are predicted. Also the data in (6.13) are taken care of: the complement of *bought* is referentially theta marked and, hence, can long *wh*-move (modulo Subjacency), while the adjunct *why* is not theta marked at all, and, hence, cannot be extracted over a *wh*-island.

6.3.3.2 Critique

Note that, although the account briefly presented above shifts emphasis from the complement/adjunct dichotomy to referentiality, it still implicitly assumes the relevance of this dichotomy to extraction: since it is only complements that receive a θ-role, it is only a subset of

[14]Note the similarity to the semantic criterion (C2) on p.255; it is interesting that the semantic criterion, dominant in traditional Polish linguistics, was rediscovered within GB on the basis of extraction facts.

[15]Rizzi (1990) and Cinque (1990) go much further than that in reformulating ECP, but this does not matter for the discussion below.

them that receive a referential θ-role. This means that adjuncts are, by a fiat, non-referential. This, however, is a very controversial result.

Consider the Italian examples (6.19) (Rizzi, 1990, p.91):

(6.19) a. ?Con che chiave non ti ricordi che porta abbiamo aperto?
'With what key don't you remember which door we opened?'

b. ?In che negozio non ti ricordi che cosa abbiamo comprato?
'In what shop don't you remember what we bought?'

c. ??A che ora non ti ricordi che cosa abbiamo detto?
'At what time don't you remember what we said?'

d. *In che modo non ti ricordi che cosa abbiamo detto?
'In what way don't you remember what we said?'

e. *Per che ragione non ti ricordi che cosa abbiamo detto?
'For what reason don't you remember what we said?'

As (6.19d–e) show, long-distance extraction of *in che modo* 'in what way' and *per che ragione* 'for what reason' is ungrammatical, as predicted by the fact that they are adjuncts and, hence, not referentially theta marked. However, the relative acceptability of (6.19a) is rather surprising: if the instrumental phrase *con che chiave* is an adjunct, as the functional criterion would predict, its extraction should lead to strong ungrammaticality similar to that of (6.19d–e). For this reason, Rizzi (1990) is forced to classify instrumental dependents as optional complements assigned a referential θ-role.

This decision could perhaps be defended: instrumental phrases are classified as complements in those theories which rely on the so-called iterability criterion when distinguishing complements from adjuncts; see, e.g., the discussion of LFG in §6.4 below. Examples (6.19b–c) involving locative and temporal phrases are, however, irreconcilable with any understanding of the complement/adjunct dichotomy: such phrases are considered typical adjuncts by all criteria (C1)–(C3) considered so far, as well as by the iterability criterion (C4) below (on p.267). And yet, as the judgements in (6.19b–c) show, they behave as typical referential complements with respect to long-distance extraction.[16] Hence, within Rizzi's (1990) system, locative and temporal phrases must be classified as complements, a move Rizzi (1990) explicitly makes (p.91) at the cost of violating all intuitions behind the complement/adjunct dichotomy.

This result seems to be rather symptomatic of the general confusion concerning the dichotomy at hand within linguistics in general, and within the P&P framework in particular. It is interesting that even Rizzi (1990) seems to be of two minds as to the nature of the two classes of dependents distinguished by the extraction facts. For example, the troublesome complements of verbs such as *behave* and *weigh* are occasionally called complements (e.g., pp.77–78), and at other times adjuncts (e.g., pp.4 and 16). It is actually only in an endnote that Rizzi (1990) clearly states that the referential-nonreferential distinction may override the standard complement/adjunct dichotomy:

[16] Similar facts hold also of English; cf., e.g., Bolinger (1978), cited by Lasnik and Saito (1992, p.188, n.19).

> Notice incidentally that the observed behavior of *wh* movement of predicates provides further evidence that the argument/adjunct distinction is not an accurate characterization of the relevant empirical generalization, as genuine adjuncts pattern with elements as diverse as lexically selected adverbials and measure phrases, idiomatic direct objects, specifiers of the direct object, and predicates. Again, the referential-nonreferential distinction appears to be closer to empirical adequacy.
> (Rizzi, 1990, n.17, p.130)

Finally, Rizzi's (1990) arguments notwithstanding, researchers working on extraction and locality within the P&P framework have been by and large unwilling to give up the account in terms of the complement/adjunct distinction. The following citation is rather typical:[17]

> Let's look at each kind of movement in turn, distinguishing adjunct *wh*-movement from argument *wh*-movement (I'll revert to refering to the two kinds of *wh*-movement in this way, even though Rizzi argues that this is not really correct...).
> (Roberts, 1997, p.246)

In summary, the data discussed by Rizzi (1990) clearly show that the extraction facts do not reflect the complement/adjunct dichotomy, and seem to rely on the referential-nonreferential distinction instead.[18] We will see in §10.2.2.3 that this distinction seems to be also behind syntactic case assignment facts in Polish.

6.3.4 The Minimalist Program

The confusion about the status of complements vs. adjuncts present in GB continues in the so-called Minimalist Program (MP; Chomsky 1995c). In fact, there seems to be even less agreement on this issue here, probably due to the lack of stability of this theory and its highly programmatory character.[19]

For example, the introduction textbook to the Minimalist Program Radford (1997) does not mention adjuncts in the chapter on syntactic structures (ch.3), which presents X′-theory. Moreover, although adjuncts are introduced later (pp.143 and 371) in the standard X′-theoretic way as sisters and daughters of X′-level categories (cf. (6.1) above), they are treated in other places of the book as specifiers (e.g., pp.223 and 231) or as adjoined to a maximal projection (e.g., pp.422 and 435–439), essentially without a comment.

The same indecision can be observed in source Minimalist texts. Chomsky (1995a) says on p.402 that "specifiers are distinct in properties from adjuncts," but then seems to retract from this position on pp.420–423, where he analyses *often* as a VP specifier. This analysis, as well as some problems that it brings about, are repeated in Chomsky (1995b, p.329–332)

[17] This is not surprising given that Rizzi himself reverts to the complement/adjunct distinction when speaking about the extraction facts in his later work, e.g., Rizzi (1994, pp.364–365).

[18] See also Kuno and Takami (1997) for arguments against Rizzi's (1990, 1994) account of Negative Islands in terms of the complement/adjunct (or referential/nonreferential) distinction.

[19] See in this connection the critique of MP in Johnson and Lappin (1997). Pullum (1996) includes the critique of the Chomsky (1993) version of MP from the point of view of sociology of science. Many of the points made in these two articles are also implicit in Sternefeld (1998).

and concluded with the sincere "I leave such questions without any useful comment." MP's loss with respect to the status of adjuncts in the grammatical theory is also reflected in the following passage, repeated from p.258 above.

> [W]e still have no good phrase structure theory for such simple matters as attributive adjectives, relative clauses, and adjuncts of many different types.
> (Chomsky, 1995b, p.382, n.22)

In summary, it seems that the Minimalist Program does not have anything interesting to say about adjuncts, and we will have nothing interesting to say about MP in the rest of this study.

6.4 LFG

6.4.1 Intuitions

In LFG, unlike in the P&P framework, the complement/adjunct distinction is based on the iterability criterion, given in (C4).

(C4) the **iterability criterion**: two or more instances of the same adjunct type can combine with the same head, but this is impossible for complements.[20]

This position is made clear, e.g., in Bresnan (1982c, p.164):

> In contrast to the grammatical functions which are assigned to predicate arguments, multiple locative, temporal, and manner adjuncts can occur in a single clause:
>
> (51) Fred *deftly* [Manner] handed a toy to the baby *by reaching behind his back* [Manner] *over lunch* [Temp] *at noon* [Temp] *in a restaurant* [Loc] *last sunday* [Temp] *in Back Bay* [Loc] *without interrupting the discussion* [Manner].

Note that the classification based on (C4) differs from that based on the functional criterion (C3). For example, as discussed in Bresnan (1982c, p.165), (C3) predicts that instrumental phrases are arguments; as (6.21) shows, they cannot be iterated:

(6.20) John escaped from prison *with dynamite.*
'John used dynamite to escape from prison.'

(6.21) *John escaped from prison *with dynamite with a machine gun.*
'John used dynamite and machine gun to escape from prison.'

[20] This formulation of the iterability criterion is taken from Pollard and Sag (1987, p.136).

This result is clearly at odds with the functional criterion (C3): the instrumental phrase *with dynamite* is clearly not "indispensable to complete the meaning of the verb."

It is less clear whether the iterability criterion (C4) is consistent with the semantic criterion (C2): this depends on whether the instrumental phrase is considered to "participate in the process is a special way," or not.

It should be mentioned that although, within LFG, the iterability criterion is the most prominent test for distinguishing complements and adjuncts (as we will see below, it is built-in into LFG representations), a reference to the syntactic-functional criterion (C3′) is also sometimes made. For example, Simpson (1991, 298ff.): "adjuncts are optional... [a]rguments are usually obligatory..." We will not deal with the issue of compatibility of these two criteria here.

6.4.2 Representations

In contradistinction to transformational approaches, LFG has never made a configurational distinction between complements and adjuncts. Kaplan and Bresnan (1982, pp.214–216) are quite explicit on this point: they assume that adjuncts are configurational sisters to other non-subject dependents, in accordance with rules such as (6.22) below (their (85); cf. Kaplan and Bresnan 1982, p.217 for extensions).

(6.22)
$$\begin{array}{lllccc} \mathrm{VP} & \rightarrow & \mathrm{V} & \mathrm{NP} & \mathrm{NP} & \mathrm{PP}^* \\ & & & (\uparrow \textsc{obj}) = \downarrow & (\uparrow \textsc{obj2}) = \downarrow & \downarrow \in (\uparrow \textsc{adjuncts}) \end{array}$$

The same configurational non-distinction between complements and adjuncts is assumed in other LFG work, e.g., Neidle (1982, p.406), Simpson (1991, pp.222ff.) and Bresnan (1995, ch.5).

The level of representation at which adjuncts differ from other dependents is the level of grammatical functions, i.e., f-structure. For example, the f-structure representation of the sentence (6.23) is (6.24).

(6.23) A girl handed the baby a toy on Tuesday in the morning.

(6.24)
$$\left[\begin{array}{ll}
\textsc{subj} & \left[\begin{array}{ll}\textsc{spec} & \textsc{a}\\ \textsc{num} & \textsc{sg}\\ \textsc{pred} & \textsc{girl}\end{array}\right]\\
\textsc{tense} & \textsc{past}\\
\textsc{pred} & \text{‘}\textsc{hand}\langle(\uparrow \textsc{subj})(\uparrow \textsc{obj}2)(\uparrow \textsc{obj})\rangle\text{’}\\
\textsc{obj} & \left[\begin{array}{ll}\textsc{spec} & \textsc{the}\\ \textsc{num} & \textsc{sg}\\ \textsc{pred} & \text{‘}\textsc{baby}\text{’}\end{array}\right]\\
\textsc{obj}2 & \left[\begin{array}{ll}\textsc{spec} & \textsc{a}\\ \textsc{num} & \textsc{sg}\\ \textsc{pred} & \text{‘}\textsc{toy}\text{’}\end{array}\right]\\
\textsc{adjuncts} & \left\{\text{“on Tuesday”, “in the morning”}\right\}
\end{array}\right]$$

In (6.24), f-structures corresponding to adjuncts are represented as members (in (6.24), abbreviated to “on Tuesday” and “in the morning”) of the set-valued attribute ADJUNCTS. This distinguishes them from arguments such as the subject (SUBJ) and the objects (direct, OBJ, and indirect, OBJ2): the values of arguments are single f-structures rather than sets of f-structures. This, together with the Uniqueness Principle (6.25) (cf. Kaplan and Bresnan 1982, p.181) ensures that in any given f-structure, there may be at most one value for each argument, but there might be in principle any number of adjuncts, also of the same type, in accordance with the iterability criterion (C4).

(6.25) *Uniqueness*
In a given f-structure, a particular attribute may have at most one value.

Another consequence of this representation of adjuncts is that “since there is no notation for... referring to particular members of that set, there is no way that adjuncts can be restricted by lexical schemata associated with the predicate” (Kaplan and Bresnan, 1982, p.216), i.e., a lexical item cannot encode restrictions on what kinds of adjuncts it may occur with. In other words, while SUBJ, OBJ, OBJ2, etc. represent selected arguments, ADJUNCTS are not selected.[21]

In summary, the approach to the complement/adjunct dichotomy adopted within LFG differs considerably from that of the transformational P&P framework. The main criterion for distinguishing complements and adjuncts is the iterability criterion (C4), hard-wired into functional representations: the value of ADJUNCTS is a set of f-structures, values of other grammatical functions are single f-structures. Unlike P&P, LFG does not posit any configurational distinction between complements and adjuncts. Thus, in essence, the distinction at hand is treated as a lexico-semantic dichotomy.

[21] See also Simpson (1991, p.299).

6.5 HPSG

"In HPSG theory, as in linguistic theory at large, the analysis of adjuncts is at a very primitive stage" (Pollard and Sag, 1987, p.158). This statement is much less true today than it was in mid-1980's. As we will see below and in Chapter 9, there has been considerably more discussion on the nature of the complement/adjunct distinction within HPSG than within any other linguistic framework. In the three subsections below we will examine the treatment of adjuncts in Pollard and Sag (1987), in Pollard and Sag (1994), and in Kasper (1994), which combines the best features of the previous two. We will defer discussion of the so-called 'Adjuncts-as-Complements' approach to the dichotomy at hand to Chapter 9.

6.5.1 Pollard and Sag (1987)

6.5.1.1 Intuitions

Although there is no generally accepted precise criterion for distinguishing complements and adjuncts in HPSG, Pollard and Sag (1987) assume, in accordance with the syntactic-functional criterion (C3′), that adjuncts are always optional:

> [O]ptional complements must be distinguished from other optional constituents, known as *adjuncts* or *modifiers*, whose relationship to the head is of a different syntactic and semantic nature.
>
> (Pollard and Sag, 1987, p.134)

Pollard and Sag (1987, pp.135–139) give also a number of other "rough-and-ready syntactic and semantic diagnostics which usually serve to make the distinction," among them the iterability criterion (C4) (cf. p.267 above). The importance of this criterion is confirmed on p.158:

> [W]hile a complement daughter discharges, or cancels, the subcategorization requirement that it matches, an adjunct does not: for a given head there can be at most one PP[on] complement or at most one VP[BSE] xcomp, but there can be arbitrarily many relative clauses or locative adjuncts.
>
> (Pollard and Sag, 1987, p.158)

Another property of adjuncts allegedly distinguishing them from complements is what Pollard and Sag (1987) call *constancy of semantic contribution*:

> In general, a given adjunct can occur with a relatively broad range of heads while seeming to make a more-or-less uniform contribution of semantic content across that range. A given optional complement, by contrast, is typically limited in its distribution to co-occurrence with a small... class of heads...; in addition, the semantic contribution of the complement is idiosyncratically dependent upon the head.
>
> (Pollard and Sag, 1987, p.136)

The serious shortcoming of this test is that it seems to treat the notion *adjunct* in absolute terms, while other criteria speak of *adjuncts of a head.* For example, according to the functional and syntactic-functional criteria, the obligatory non-subject dependents of verbs such as *behave* (as in *behave well*), *live* (as in *live in Tübingen*), etc. are complements of these verbs, while the diagnostic above predicts that they are adjuncts: both manner adverbials and locative adverbials "occur with a relatively broad range of heads" and both have "more-or-less uniform contribution of semantic content across that range," the range including verbs *behave* (in case of manner adverbials) and *live* (in case of locative adverbials).

Other diagnostics cited in Pollard and Sag (1987) are:

- *order-dependence of content*: "the contribution of adjuncts to semantic content can depend upon their relative order in a way which does not apply to optional complements";
- *relative order*: "[i]n English, at least some adjuncts tend to be ordered after complements";
- *possibility of internal gaps*: "at least some adjuncts appear to generally disallow unbound internal traces..."

As acknowledged by Pollard and Sag (1987, pp.135–139), these tests seem to be much less robust than the criteria discussed above, so we will ignore them below.

In summary, the main criteria for the complement/adjunct distinction adopted in Pollard and Sag (1987) are the syntactic-functional criterion (C3′) and the iterability criterion (C4). Thus, the intuitions behind the dichotomy at hand adopted in early HPSG seem to be rather close to those in LFG.

6.5.1.2 Representations

Also Pollard and Sag's (1987) representation of the complement/adjunct dichotomy is *prima facie* similar to that assumed within LFG, but only very superficially so: Pollard and Sag (1987) assume a set-valued feature ADJUNCTS, like in LFG. The rôle of this feature is, however, very different from the role of its LFG cognate: it is specified within lexical entries of words and it encodes information about *possible* adjuncts of these words, rather than the information about the actual adjuncts that the given head combines with, as in LFG.

More specifically, Pollard and Sag (1987, p.161) assume that ADJUNCTS is a *head* attribute whose value is a set of SYNTAX structures. For example, one of the elements of ADJUNCTS of a common noun is RELCLAUSE, i.e., the SYNTAX value of relative clauses. In addition, *head-complement structure*s bear a new attribute, ADJ-DTRS, with sets of *sign*s as its possible values.[22]

Now, whenever an adjunct combines with a head, its SYNTAX value must be identified with an element of the head's ADJUNCTS. Formally, this is required by the following principle:

[22]This is actually one of the alternative representations considered by Pollard and Sag (1987, pp.161–168). They do not commit themselves to any of those, so we chose one that is most similar in spirit to the current HPSG approaches to the complement/adjunct dichotomy; cf. Chapter 9.

(6.26) ADJUNCTS PRINCIPLE:

$$\textit{constituent structure} \rightarrow \begin{bmatrix} \text{HEAD-DTR}|\text{SYN}|\text{LOC}|\text{HEAD}|\text{ADJUNCTS } \boxed{1} \\ \text{ADJ-DTRS } \boxed{2} \end{bmatrix}$$

Condition: $\forall x \in \boxed{2}\ \exists y \in \boxed{1}$ such that the SYNTAX of x is equal to y.

It is interesting to note that LFG and the Pollard and Sag (1987) version of HPSG employ feature ADJUNCTS to opposite tasks. In LFG, there is no way of referring to particular members of sets, so having set-valued ADJUNCTS ensures that lexical items cannot select adjuncts (cf. discussion below (6.25) on p.269). In Pollard and Sag's (1987) HPSG, on the other hand, the feature ADJUNCTS is supposed to encode selectional restrictions on adjuncts imposed by the head. In other words, according to the analysis sketched above, it is heads that select adjuncts rather than the other way round.

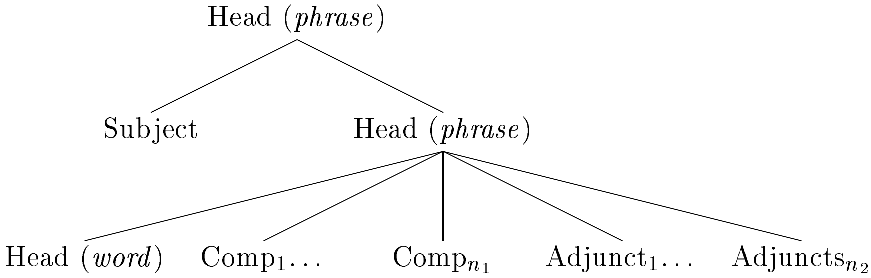
Another important feature of this analysis is that adjuncts may be sisters of complements: nothing in the account of Pollard and Sag (1987) prevents the schemata responsible for syntactic realization of complements (their Rules 1 and 2) from having a non-empty ADJUNCTS value.[23] Pollard and Sag (1987, p.165) motivate this trait of their account with example (6.27):

(6.27) Sandy proved to her class yesterday that the Axiom of Infinity is inconsistent.

In (6.27), the adjuncts *to her class* and *yesterday* occur between the head verb *proved* and its clausal complement *that the Axiom of Infinity is inconsistent.* On the assumptions that 1) complements are sisters to their heads, and that 2) phrases cannot be discontinuous, assumptions that Pollard and Sag (1987) make, (6.27) can be accounted for only if the adjuncts are realized as sisters of the head verb, too.

In summary, on Pollard and Sag's (1987) approach, heads select adjuncts, which may be realized as sisters to complements, as schematically illustrated in (6.28). We will see in Chapter 9 that these features of that analysis are also present (in a modified form) in current HPSG approaches to the dichotomy at hand.

(6.28)



6.5.2 Pollard and Sag (1994)

Pollard and Sag (1994, pp.55–57) retract their analysis in Pollard and Sag (1987) and treat adjuncts as selecting their heads, both semantically and syntactically. Technically, *substantive*

[23] In fact, adjuncts are allowed as sisters to subjects, too; this feature of Pollard and Sag's (1987) analysis does not seem to be intended.

heads are assumed to be specified for the feature MOD, whose values may be either *synsem* or *none* (Pollard and Sag, 1994, pp.396–398). Adjuncts are simply *signs* with a *synsem*-valued ...|HEAD|MOD; it is this feature that encodes an adjunct's selectional specification. Pollard and Sag (1994, p.55) give the following example of a (partial) lexical entry for the attributive adjective *red*, which selects an almost saturated nominal phrase:[24]

(6.29)
$$\begin{bmatrix} \textit{word} & \\ \textsc{synsem}|\textsc{loc} & \begin{bmatrix} \textsc{cat} & \begin{bmatrix} \textsc{head} & \begin{bmatrix} \textit{adj} & \\ \textsc{mod} & \mathrm{N}'{:}\begin{bmatrix} \textsc{index} & \boxed{1} \\ \textsc{restr} & \boxed{2} \end{bmatrix} \\ \textsc{prd} & - \end{bmatrix} \\ \textsc{subcat} & \langle\ \rangle \end{bmatrix} \\ \textsc{cont} & \begin{bmatrix} \textsc{index} & \boxed{1} \\ \textsc{restr} & \left\{ \begin{bmatrix} \textsc{reln} & \textit{red} \\ \textsc{arg} & \boxed{1} \end{bmatrix} \right\} \cup \boxed{2} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

Now, an adjunct and a head that it selects combine via the ID schema below...

(6.30) SCHEMA 5:

a phrase with DTRS value of sort *head-adjunct-structure*, such that the MOD value of the adjunct daughter is token-identical to the SYNSEM value of the head daughter.

...where *head-adjunct-structure* is a subsort of the *head-structure* with the following feature declarations (Pollard and Sag, 1994, p.399):

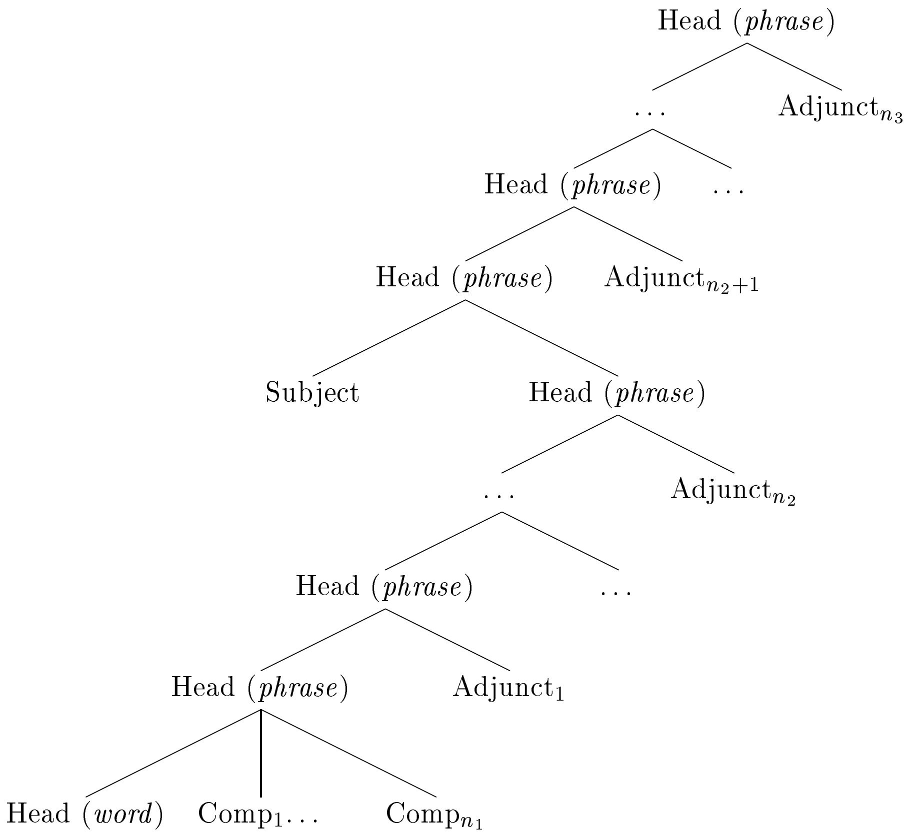
(6.31)
$$\textit{head-adjunct-structure}{:} \begin{bmatrix} \textsc{head-dtr} & \textit{phrase} \\ \textsc{adjunct-dtr} & \textit{phrase} \\ \textsc{comp-dtrs} & \textit{elist} \end{bmatrix}$$

There are a number of points to make about SCHEMA 5 and the feature declarations (6.31). First, SCHEMA 5 ensures that the head meets selectional restrictions imposed by the adjunct: the head's SYNSEM value must be structure-shared with the adjunct's MOD value. Second, according to (6.31), adjuncts modify only *phrases*, not *words*; this is because HEAD-DTR in *head-adjunct-structure* is specified as *phrase*. Since *phrases* are saturated or almost saturated *signs*, i.e., *signs* whose SUBCAT list is of length at most one (or, in more contemporary terms, whose COMPS list is empty), adjuncts must attached higher in the syntactic tree than complements, and may be attached higher than the subject (depending on the adjunct's MOD value). Finally, since the value of ADJUNCT-DTR is a single *phrase* (rather than a list of *phrases*), adjuncts can be combined with heads one by one. This leads to syntactic configurations schematically illustrated in (6.32).

---

[24]'N′:$\boxed{0}$' abbreviates $\begin{bmatrix} \textsc{loc} & \begin{bmatrix} \textsc{cat} & \begin{bmatrix} \textsc{head} & \textit{noun} \\ \textsc{subcat} & \langle \mathrm{DetP} \rangle \end{bmatrix} \\ \textsc{cont} & \boxed{0} \end{bmatrix} \end{bmatrix}$.

(6.32)



Note that on the approach of Pollard and Sag (1994), adjuncts can no longer be sisters of complements, nor are they in any sense selected by heads. This drastic change with respect to Pollard and Sag (1987) was caused by the fact that the analysis of Pollard and Sag (1987) "has resisted extension to a satisfactory account of how adjuncts contribute their content to the content of the phrases they occur in" (Pollard and Sag, 1994, p.55). On the other hand, on the approach sketched here and on the assumption that the content of the phrase is token-identical with the content of the adjunct, as guaranteed by the SEMANTICS PRINCIPLE given below in (6.33), this does not seem to be a problem: the kind of contribution an adjunct makes to the phrase it occurs in is specified in the adjunct's CONTENT, as illustrated in the case of the adjective *red* above (cf. (6.29)).

(6.33) SEMANTICS PRINCIPLE (Pollard and Sag, 1994, p.56):

> In a headed phrase, the CONTENT value is token-identical to that of the adjunct daughter if the DTRS value is of sort *head-adjunct-structure*, and with that of the head daughter otherwise.

6.5.3 Kasper (1994)

Pollard and Sag (1987, 1994) tacitly assume that adjuncts may be sisters to complements only if they are selected by heads, just as complements are. Pollard and Sag (1987) decide in favour of both issues, i.e., adjuncts may be sisters to complements and they are selected by heads, while Pollard and Sag (1994) decide against them: adjuncts cannot be sisters to complements and they are not selected by heads. However, what seems to be required is that adjuncts be sisters to complements (for word order reasons; cf. (6.27) above) without being selected by heads (they should select heads, for reasons of semantic composition).

Kasper (1994) shows that this can be done, i.e., that the two issues apparently conflated by Pollard and Sag (1987, 1994) are actually orthogonal. Together with Pollard and Sag (1987), Kasper (1994) assumes that *head-complement-structure*s bear, in addition to HEAD-DTR and COMP-DTRS, a *list*-valued attribute ADJ(unct)-DTRS. Together with Pollard and Sag (1994), he assumes that adjuncts syntactically select heads via feature MOD.

The main problem for such an analysis is how to get the semantics of the modified phrase right. On the approach of Pollard and Sag (1994), the content of the phrase is token-identical to that of the adjunct, if present, and to that of the head, otherwise; see the SEMANTICS PRINCIPLE (6.33) above. However, on the approach of Kasper (1994), there may be many adjuncts present within a single phrase, and they may additionally enter into scoping relations. Thus, in order to simulate the effect of the SEMANTICS PRINCIPLE, the adjunct with the narrowest scope should semantically modify the head, the adjunct with the next wider scope should take the content of that adjunct as its semantic argument, etc., with the widest-scoping adjunct providing the content of the whole phrase. This, in turn, leads to a syntax-semantics mismatch: although syntactically adjuncts always modify the head, semantically, they modify the adjunct with minimally narrower scope (or the head, if there is no such adjunct).

For this reason, Kasper (1994) splits MOD values into a syntactic part, SYN, representing the *category* description of the head, and a semantic part, SEM, encompassing both *content* and *context* of the modified element:

(6.34) $$mod\colon \begin{bmatrix} \textsc{syn} & cat \\ \textsc{sem} & \begin{bmatrix} local \\ \textsc{cont} & content \\ \textsc{ctxt} & context \end{bmatrix} \end{bmatrix}$$

Now, the principle that adjuncts syntactically select the head can be specified as follows:

(6.35) ADJUNCT SYNTAX PRINCIPLE (Kasper, 1994, p.58):

In a *head-complement* structure the MOD|SYN value of each adjunct daughter (if any) is token-identical with the CAT value of the head daughter.

On the other hand, the effect of Pollard and Sag's (1994) SEMANTICS PRINCIPLE is simulated by the somewhat more complicated principle below:

(6.36) SEMANTICS PRINCIPLE (Kasper, 1994, pp.55 and 58):

In a *head-complement* structure,

a. if ADJ-DTRS is an empty list, then the CONTENT value is token-identical to that of the head daughter,

b. otherwise,

- the CONTENT value is token-identical to that of the first element of ADJ-DTRS, and
- the MOD|SEM value of the last adjunct on ADJ-DTRS is token-identical with the LOCAL value of the head daughter, and the MOD|SEM of every other adjunct on ADJ-DTRS is token-identical with the LOCAL value of the next adjunct on ADJ-DTRS.

For reasons of brevity, we cannot further explicate Kasper's (1994) account in detail; see Kasper (1994) for discussion and for application of this analysis to a variety of adjunct types. One important thing to note about this analysis, though, is that, just as in Pollard and Sag (1987), adjuncts are sisters to complements in a particular sense: they are present within the same *head-complement-structures* as complements, but they are placed on a different list, i.e., on ADJ-DTRS, while complements are placed on COMP-DTRS. Thus, to the extent that values of DTRS represent configurational information in HPSG, Kasper (1994) (and Pollard and Sag (1987)) preserves configurational distinction between complements and adjuncts.

In summary, the analysis of Kasper (1994) successfully combines the most desirable features of the analyses of Pollard and Sag (1987, 1994): it allows adjuncts to be 'sisters' of complements and, at the same time, it gets the semantics right.

6.6 Complements vs. Adjuncts: Summary

6.6.1 Intuitions

In this Chapter, we looked at various ways of understanding and representing the complement/adjunct dichotomy within various theories. We singled out four most popular relatively pre-theoretical criteria for distinguishing these two classes of dependents:

(C2) the **semantic criterion**: complements express the persons or things participating in the process in a special way, whereas adjuncts express the time, the place, the manner, etc. connected with that process;

(C3) the **functional criterion**: complements, unlike adjuncts, are indispensable to complete the meaning of the verb; hence the number of complements, but not adjuncts, is limited for every verb;

(C3′) the **syntactic-functional criterion**: complements tend to be obligatory, adjuncts are always optional;

(C4) the **iterability criterion**: two or more instances of the same adjunct type can combine with the same head, but this is impossible for complements.

Of these four criteria, the syntactic-functional semi-criterion (C3′), together with its stronger, even if somewhat vaguer version (C3), seems to be the most popular one: it is cited in linguistic textbooks cross-theoretically (Lyons (1976), Radford (1988), Büntig (1989), Borsley (1991, 1999a), Haegeman (1994)), in dictionaries (Bußmann (1990), Trask (1993), Polański (1993), Crystal (1997)), and in some more recent Polish grammars (Bąk (1984), Saloni and Świdziński (1985), Nagórko (1996), Świdziński (1997)). It is also the most prominent criterion in explicit discussions of verbal valency (Vater (1978a), Pollard and Sag (1987), Sawicki (1988)).

Another popular test is the iterability criterion (C4): it seems to be the principal criterion in LFG, but it is also acknowledged within HPSG.

Finally, the semantic criterion (C2), is the basis for the complement/adjunct distinction in traditional Polish linguistics, but it was also re-discovered within the GB framework in the late 1980's / early 1990's.

6.6.2 Representations

As far as representations of this dichotomy are concerned, there are two opposite tendencies in linguistic literature. Within Principles and Parameters, it is believed that there is a fundamental tree-configurational difference between the way complements and adjuncts are realized: the former are often assumed to be sisters to heads, while the latter are realized higher in the tree. On the other hand, within LFG, adjuncts are tree-configurationally non-distinguishable from complements; both are assumed to be typically sisters to heads in c-structures. The difference between these two classes of dependents is represented in f-structures; adjuncts, but not complements, are members of the head's ADJUNCTS value. Interestingly, to the best of our knowledge, these positions are adopted within P&P and LFG, essentially without any comparison with other position.

HPSG is perhaps exceptional among linguistic theories in that it takes the issue of the complement/adjunct dichotomy seriously and considers various ways of representing the distinction: the solution adopted by Pollard and Sag (1994) patterns with P&P in assuming a clear-cut configurational distinction between complements and adjuncts, while Pollard and Sag (1987) and Kasper (1994) are closer to LFG in positing that adjuncts are sisters to complements.[25]

In Chapter 9, we will consider (and further develop) even stronger proposals for treating adjuncts syntactically on a par with complements.

6.6.3 Conclusions

Before concluding this Chapter, let us note that the vagueness of the criteria above (especially, (C2) and (C3)), as well as the brevity of this Chapter reflect the state of our knowledge about the dichotomy at hand. It is rather curious that large parts of linguistics theories, especially those within the P&P framework, rest heavily on such ill-understood notions as

[25] On the other hand, unlike in LFG, there is still a weak configurational distinction between complements and adjuncts on the analysis advocated by Pollard and Sag (1987) and Kasper (1994): the former are realized on the COMP-DTRS attribute, while the latter on ADJ-DTRS.

complement and *adjunct*. We hope that the subsequent Chapters will shed some light on this murky territory.

The next two Chapters are devoted to refuting the claim that the complement/adjunct dichotomy must be represented tree-configurationally: in Chapter 7, we deal with what seems to be the most convincing argument for such a configurational distinction, the so-called *do so* substitution test, while in Chapter 8 we examine a range of phenomena claimed to reflect the configurational distinction in one way or another, and show that none of them actually reflects the complement/adjunct dichotomy in the language which is the main empirical basis of this study, i.e., in Polish. The main result of these two Chapters is that the tree-configurational representation of the complement/adjunct distinction is unmotivated.

Further, in Chapter 9, we discuss approaches to modification which do not assume a configurational complement/adjunct distinction, choose and explicitly formalize one of them, and show that this formalization correctly interacts with an HPSG theory of quantification.

Finally, in Chapter 10, we adduce additional arguments (from case assignment) for this approach to modification and slightly revise our analysis of case assignment in Polish developed in the previous Part.

Chapter 7

Do So

This Chapter is devoted to a critical examination of perhaps the best known argument for the configurational difference between complements and adjuncts: the so-called *do so* substitution test. We will present the test in §7.1, and discuss how *do so* relates to the 'deep' vs. 'surface' anaphora distinction in §7.2. In §7.3, we will provide what we view as conclusive arguments against configurational interpretation of this test.[1] Finally, we summarize the results of this Chapter in §7.4 and list sources of attested examples in §7.5.

7.1 The *Do So* Test

The gist of the *do so* test is the assumption that, in terms of GB, "*do so* derives its interpretation from a preceding V′," according to one textbook exposition (Borsley, 1991). This immediately explains the unacceptability of the b. sentences below, as opposed to the grammatical a. sentences.

(7.1) a. Jörg drank wine yesterday and I'll do so today.

b. *Stefan drank beer yesterday and I'll do so wine today.

(7.2) a. Anke makes her tea in the kitchen, while Petra does so in the office.

b. *Anke put her tea in the kitchen, while Petra did so in the office.

On the assumptions that 1) the minimal V′ consists of the lexical V and all its complements, and that 2) each adjunct adds its own V′ layer, (7.1a) is acceptable because *do so* refers to the meaning of the V′ *drank wine* (minus tense), while (7.1b) is unacceptable because for it to be interpretable, *do so* would have to refer to the meaning of *drank*, which does not constitute a V′ (*drank beer* does). Similarly, in (7.2a), *do so* refers to the V′ *make her tea*, while (7.2b) is ungrammatical because there is no V′ *put her tea*: the minimal V′ contains both the direct object and the directional PP.

[1] The most direct arguments against the standard (configurational or surface) understanding of the *do so* test can be found in §7.3.3.3.

This test, first introduced in Lakoff and Ross (1966, 1976), quickly gained prominence: linguists readily used it to show that certain dependents are / are not adjuncts, cf. e.g. Zwicky (1970, p.334), Andrews (1971a, p.250), Kuno (1973, p.366), Silva (1975, p.346), Grosu (1975, p.644), Jackendoff (1977), Kefer (1979, p.430), van Oirsouw (1981, p.555), Gazdar *et al.* (1982, pp.602–603), Somers (1984), and it soon made it to linguistic textbooks, e.g., Baker (1978, §11.2), Radford (1988, pp.234–235), Borsley (1991, pp.62–63)[2] and Haegeman (1994, p.88). Some recent uses of this test include: Zagona (1988, pp.33–34), Bresnan (1994, p.83), Macfarland (1995, pp.104–105), Verspoor (1997, pp.64–65), Baxter (1999b, §2.2.1).

However, to the best of our knowledge, the hypothesis that the *do so* substitution facts are best interpreted configurationally has never been substantiated or critically evaluated in the literature.[3] In fact, the 'test' has been flawed ever since its conception, witness Lakoff and Ross's (1976) claim that "*do so* replaces all of the constituents of the verb phrase and only these" (p.105), that is, in more contemporary terms, that *do so* refers to the meaning of the minimal V′ only, thus excluding examples of the kind in (7.3).

(7.3) Jörg drank wine yesterday and I did so too.

Moreover, Lakoff and Ross (1976, p.110) admit themselves that "the material we have discussed above is suggestive of the correctness of our claim, but there are many puzzling constructions with *do so* that we do not yet understand and that we have not included in this paper." From this perspective, the career of 'the configurational *do so* test' is an interesting sociolinguistic phenomenon that begs an explanation. We show below (§7.3) that the configurational import of the *do so* test cannot be maintained. Instead, we argue that *do so* anaphora is a conceptual[4] phenomenon, i.e., essentially a deep anaphor. Before we can do that, though, we briefly examine the discussion on 'deep' vs. 'surface' anaphora found in the literature (§7.2).

7.2 *Do So* and the Deep vs. Surface Anaphora Distinction

7.2.1 Deep vs. Surface Anaphora: A Short History

7.2.1.1 Hankamer and Sag (1976)

The distinction between 'deep' and 'surface' anaphora dates back to Hankamer and Sag (1976), who notice that certain (intersentential) anaphoric processes must be 'syntactically (grammatically) controlled', while others may be 'pragmatically controlled' (cf. also Sag (1976) and Sag and Hankamer (1977)). This is illustrated with the following examples (Hankamer and Sag, 1976, p.392):[5]

(7.4) [Hankamer attempts to stuff a 9-inch ball through a 6-inch hoop]
Sag: # It's not clear that you'll be able to.

[2] The *do so* test disappears from Borsley (1999a), though.

[3] See, however, Miller (1990, 1992), discussed in §7.3.1 below.

[4] In this Chapter, we use the term 'conceptual' roughly in the sense of Jackendoff (1983, 1990, 1997), i.e., we do not make a distinction here between semantic, pragmatic and cognitive levels of linguistic representation.

[5] The cross-hatch (#) indicates that the sentence is incompatible with the context.

(7.5) [Same context]
Sag: It's not clear that you'll be able to do it.

As (7.4) shows, VP Ellipsis (VPE, called VP Deletion by Hankamer and Sag (1976)) does not allow purely pragmatic control (i.e., it is 'surface' anaphora), while, as evidenced by (7.5), *do it* does allow it (it is an instance of 'deep' anaphora).

Hankamer and Sag (1976) move on to show that this is not just an accidental property of a class of anaphors, but it correlates with many other properties.

Structural Identity Hankamer and Sag (1976) show that in case of surface anaphora, the syntactic form of the antecedent must be parallel to that of the anaphor. For example, the active surface anaphor cannot refer to a passive antecedent, cf. (7.6a)–(7.7a) from Hankamer and Sag (1976, p.413). On the other hand, in case of deep anaphora, the antecedent (if syntactically present at all) does not have to be parallel to the anaphor, cf. (7.6b)–(7.7b).

(7.6) Nobody else would take the oats down the bin,

a. so Bill did.

b. so Bill did it.

(7.7) The oats had to be taken down to the bin,

a. *so Bill did.

b. so Bill did it.

Missing Antecedents Deep anaphora, but not surface anaphora, exhibits the 'missing antecedent' phenomenon (Hankamer and Sag, 1976, pp.403–406):[6]

(7.8) I've never ridden a camel, but Ivan has, and he says *it* stank horribly.

(7.9) *Jack didn't cut Betty with a knife — Bill did it, *it* was rusty.

As Hankamer and Sag (1976) note (after Grinder and Postal (1971)), it is *prima facie* unexpected that *it* in the surface anaphora (VPE) example (7.8) finds an antecedent; there is no such antecedent possible in (7.10) below.

(7.10) *I've never ridden a camel, and *it* stank horribly.

On the other hand, the deep *do it* anaphora example (7.9) conforms to expectations: the pronoun *it* cannot find an antecedent in this sentence.

[6]The patient reader will excuse us for example (7.9). It comes from Bresnan (1971), i.e., it had been constructed before violence and sexism in linguistic examples became an issue.

Consistent/Contradictory Ambiguities Consider (7.11) below (Hankamer and Sag, 1976, p.420):

(7.11) I wanted to prove that the cardinality of the set was greater than it was,

a. but I couldn't. (sensible/contradictory)

b. but I couldn't do it. (sensible)

The initial part of (7.11) is ambiguous between the sensible reading, in which the set was of particular cardinality but the speaker wanted to prove that its cardinality was greater, and the contradictory reading, in which the speaker wanted to prove an obvious contradiction. Now, Hankamer and Sag (1976) note that surface anaphors preserve this ambiguity, as in the case of VPE (7.11a), but deep anaphors can refer only to 'coherent' meanings, as is the case with *do it* (7.11b).

The Analysis On the basis of observations such as above, Hankamer and Sag (1976) argue for a 'mixed' theory of anaphora: they analyse a class of anaphoric processes (including *do it*, and also sentential *it*-anaphora, nominal *one*-anaphora and Null Complement Anaphora) as pragmatically controlled (they do not have much to say about this class), and another class (including VPE, but also Sluicing, Stripping and Gapping) as syntactically controlled. The latter class is said to involve the transformational operation of deletion under syntactic identity, a stance which enables Hankamer and Sag (1976) to derive the correlations mentioned above.[7] On the other hand, the interpretation of deep anaphors makes "reference to either the deep syntactic structure of sentences in the discourse...or nonlinguistic elements present in the context of utterance" (Sag and Hankamer, 1984, p.327).

It should be noted that this analysis is modified in Sag (1976, 1979). On this modification, the necessary condition for deletion is not syntactic identity, but rather identity ('redundancy') of logical forms.[8] This, however, does not endanger the 'syntactic parallelism' condition on surface anaphora. As Sag (1979, p.160) puts it, "the requirement that antecedent and anaphor be parallel in form (in the case of surface anaphora) is accounted for indirectly. The *syntactic* identity condition is eliminated. But, since logical forms in general correspond point by point to shallow syntactic structures, it will in general be the case that whenever a deletion [i.e., surface; A.P.] anaphor arises, it is sanctioned by virtue of its logical language, which is redundant in the context of some other logical entity... That logical entity in turn is the logical analogue...of a syntactic entity...of the same general shape as the deletion target."

7.2.1.2 The Debate

Schachter (1977) vs. Hankamer (1978) A wrinkle in Hankamer and Sag's (1976) analysis, acknowledged in their fn.19, is the existence of examples such as (7.12)–(7.13) below, in which apparently the surface anaphor (VPE) is used deictically.

[7] The main argument for this is analysis comes from the 'missing antecedent' phenomenon, although they provide also other arguments, more specific to particular kinds of anaphors. See their article for details.

[8] Similar idea was independently developed by Williams (1977a).

(7.12) [Hankamer brandishes cleaver, advances on Sag]
Sag: Don't! My God, please don't.

(7.13) [An acquaintance has dyed his hair green.]
You didn't!

In view of the fact that such deixis is possible only with non-declarative illocutionary force, Hankamer and Sag (1976) are forced to restrict their theory to declarative sentences.

Schachter (1977) capitalizes on such examples and claims that there is really no surface/deep anaphora distinction. On his account, the ability of an anaphor to refer to pragmatic entities correlates with the range of possible referents of the anaphor. For example, since the referential range of *do it* is narrower than that of VPE (as illustrated by the contrast (7.14)–(7.15)), it is easier to find a pragmatic antecedent for *do it* than for VPE.

(7.14) a. *John expects to get fired, but I doubt that he'll do it.
b. ?John expects to get a raise, but I doubt that he'll do it.
c. John expects to get a job, but I doubt that he'll do it.

(7.15) a. John expects to get fired, but I doubt that he will.
b. John expects to get a raise, but I doubt that he will.
c. John expects to get a job, but I doubt that he will.

On this account, examples with non-declarative illocutionary force in which VPE can refer to pragmatic entities (as in (7.12)–(7.13) above) are explained on the assumption that the illocutionary force helps delimit the number of possible pragmatic antecedents.

Hankamer (1978) takes issue with such an account based on "the high recoverability of the meaning of the anaphor." He gives examples in which the recoverability of the meaning of the VPE is the same as in Schachter's (1977) examples, but which are nevertheless infelicitous:[9]

(7.16) [John tries to kiss Mary. She says:]
a. John, you mustn't.
b. *John, are you aware that no one else has?

(7.17) [John hands Mary the expensive present he has bought for her. She says:]
a. Oh, John, you shouldn't have.
b. John, that's very nice. *My other boyfriends never do.

Hankamer (1978) goes on to suggest that not only is the number of apparent VPE expressions allowing a pragmatic controller small, but that they are actually stated in the lexicon. Thus, expressions such as *don't*, *do*, *you wouldn't*, *may I*, *shall we*, etc. are listed in the lexicon just as, e.g., *How do you do?* is.

[9] Examples a. are Schachter's, b. — Hankamer's.

Williams (1977b) vs. Sag (1979) This is the more interesting part of the deep vs. surface anaphora debate.

Williams (1977b) rejects Hankamer and Sag's (1976) dichotomy between deep and surface anaphora on the grounds that, contrary to their claims, the distinction between syntactically and pragmatically controllable anaphors does not correlate with their behaviour with respect to missing antecedents and to the possibility of the consistent vs. contradictory ambiguity. (Williams (1977b) does not touch the problem of the structural identity correlation.) Additionally, Williams (1977b) claims that the possibility of pragmatic control boils down to the categorial status of the anaphor: pronouns "dominated by NP (*he*, *one*, *it*, and the missing N in such NPs as *John's* __)" can be pragmatically controlled, those which are not (e.g., missing VPs, *so*, *such*) cannot. This is additionally illustrated with the contrast between nearly synonymous *same thing* and *likewise* in (7.18):

(7.18) [A and B are watching C do something difficult. A says:]

a. I can do the same thing.

b. #I can do likewise.

As far as missing antecedents are concerned, Sag (1979, p.155) is "prepared to accept Williams's conclusion, though not for the reason he gives." He also agrees with Williams's (1977b) objection to the claim that deep anaphors can refer only to coherent meanings (they do not have contradictory meanings).

Sag (1979) defends, however, what he now sees as the main evidence for Hankamer and Sag's (1976) mixed theory of anaphora, i.e., that "the class of anaphoric processes that require grammatical control is precisely the class that requires superficial identity between antecedent and anaphor" (Sag, 1979, p.153).

Moreover, Sag (1979, p.159) claims further evidence for the deep/surface dichotomy: "in order to provide an adequate account of the full range of possible interpretations for sentences containing deep anaphors, one must allow further operations on logical forms." This is illustrated with the contrast between (7.19) and (7.20): in the latter case (deep anaphora *do it*), but not in the former (surface anaphora VPE), a further (abstraction) mechanism is available.

(7.19) *Sandy will hit Leslie with a wrench, and Pat will __ (to) Lee.

(7.20) Sandy will hit Leslie with a wrench and Pat will *do it* to Lee.

Sag (1979) also refutes Williams's (1977b) claim that only anaphors immediately dominated by NP can be pragmatically controlled, providing *inter alia* examples such as (7.21)–(7.23).

(7.21) [Sandy brings in a copy of *Linguistic Inquiry*]
Leslie: You're gonna read *that* journal?!

(7.22) [I point to newsreel of pre-World War I Germany, and say...]
I wish I had lived *then*.

(7.23) [I shake my head wildly and say...]
He shook his head *thus*.

Summary The changes to the deep/surface anaphora theory of Hankamer and Sag (1976) made as the result of the debate in the literature are summarized below:

- The claim that the 'missing antecedent' phenomenon correlates with the dichotomy was dropped.
- The claim that the availability of consistent/contradictory ambiguity reflects the dichotomy was also dropped.
- The 'structural identity' correlation was maintained, and another correlation was added, namely, deep anaphors allow a wider range of operations on logical forms than surface anaphors (see below).

Also the independence of deep/surface anaphora from the syntactic category of the anaphor (or the node immediately dominating it) was maintained.

7.2.1.3 Sag and Hankamer (1984)

The aim of Sag and Hankamer (1984) is to put their theory of deep/surface anaphora[10] into the broader context of discourse processing.

They assume a model of discourse in which there are two representations of discourse in the mind of the comprehender: a discourse model and a propositional representation. The discourse model represents the whole discourse, i.e., it has the 'long-term' characteristics. On the other hand, the propositional representation is a logical representation (but close to the surface syntax) of the immediately preceding discourse (hence, 'short term' characteristics).

In this model, surface anaphora is analysed in terms of the propositional representations in a way similar to the account of Sag (1976), but allowing indexicals to be interpreted directly in the discourse model. On the other hand, deep anaphora is analysed in terms of reference to some object in the model of the discourse, regardless of origin of this object (syntactic vs. contextual). Both anaphoric processes are assumed to proceed simultaneously.

Among the consequences of this set of assumptions are the following (Sag and Hankamer, 1984, p.339):

- Because the structural units of propositional representation correspond to surface syntactic units, there is parallelism of structures in case of surface anaphora.
- Surface anaphora cannot be used deictically because propositional representation reflects only what has just been uttered, and not the world around.
- Surface anaphora, but not deep anaphora, is subject to a short-term recency effect.

Note that the first two points are just reiteration of what seems to be the core of Hankamer and Sag's theory of deep/surface anaphora: partitioning all anaphors into those that can be

[10] They call surface and deep anaphora *ellipsis* and *model-interpretive anaphora*, respectively. We will (together with the rest of the literature) continue using their original terms.

pragmatically controlled and those that cannot gives exactly the same partition as dividing them according to whether their antecedents have to be syntactically parallel. This correlation is the only one that is constant in all the work by Hankamer and Sag on anaphora.[11] For this reason, it will become the focus of our inquiry into the surface/deep status of *do so* in §7.3.

7.2.1.4 Chao (1987) and Hardt (1993)

There is very little explicit work on the deep/surface anaphora distinction after Sag and Hankamer (1984), but at least two works should be mentioned, Chao (1987) and Hardt (1993), which show that the picture is not as clear as one would wish.[12]

Chao (1987) Chao (1987) distinguishes two major classes of elliptical constructions. The first (H˜ anaphors), including Gapping and Stripping, involves elliptical clauses containing a head's arguments but not the head itself (Chao, 1987, ch.1):

(7.24) Gapping
John likes movies, and [Bill __ concerts].

(7.25) Stripping

a. John gave chocolates to Mary, and [Fred __] too.
b. John gave chocolates to Mary, and [__ flowers __] too.
c. John gave chocolates to Mary, but [not __ to Jeff].

The second class (H^+ anaphors) includes VPE, Sluicing, Null Arguments, Null Complement Anaphora and *do it* anaphora.

Chao (1987) argues that the H˜ class must be strictly *syntactically* interpreted, while the "H^+ constructions are pronominal in nature, and their properties can be shown to follow from the fact that pronominals may be interpreted in the syntax..., or in the discourse representation" (Chao, 1987, pp.11–12). Among the differences between the two classes he mentions the following:

- The missing material in H˜ ellipsis "can be characterized in terms of discontinuous strings of constituents," while the missing material in H^+ must always be defined as a single syntactic constituent — VP in the case of VP Ellipsis, S′ and NP for NCA, S for Sluicing, *it* in the case of *do it* anaphora" (p.106).
- "H^+ ellipses are not subject to the parallelism and boundedness imposed on H˜ constructions" (p.107).

[11] Also the 'missing antecedents' phenomenon is mentioned in all of Hankamer and Sag (1976), Sag (1976, 1979) and Sag and Hankamer (1984), although only Hankamer and Sag (1976) claim its high relevance. Other sources are rather noncommittal.

[12] In this connection, see also Kehler (1995, §5.2).

- "H^+ elliptical-clauses may precede (but not command) their presumed antecedent clauses, and may be contained within them" (p.107); this is not the case with $\text{H}^{\sim}$ elliptical clauses.

Note that Chao (1987) effectively moves the borderline between Hankamer and Sag's (1976) deep and surface anaphora. In fact, he notes that the two distinctions (i.e., deep/surface and $\text{H}^+/\text{H}^{\sim}$) are largely overlapping, with VPE and Sluicing being the main cases where these distinctions diverge. As a result, Chao (1987, §4.3) strives to show that both VPE and Sluicing should really be analysed as deep anaphora.

First of all, Chao (1987, §4.3.1) argues that syntactic parallelism does not distinguish VPE from deep Null Complement Anaphora ((7.26a–c) are Sag and Hankamer's (1984), (7.26d–f) are Chao's (1987)):[13]

(7.26) The children asked to be squirted with the hose,

a. so they were. (VPE, surface)
b. *so we did. (VPE, surface)
c. so we did it. (*do it*, deep)
d. (*)but we refused. (NCA, deep)
e. (*)so we tried (but it didn't work very well). (NCA, deep)
f. (*)but we wouldn't. (VPE, surface)

Chao (1987) notes that the speakers' intuitions with respect to (7.26) are not uniform: many speakers find (7.26b) quite acceptable, and those speakers find (7.26d–f) also fine.

Moreover,[14] Chao (1987, p.121) notes that "[e]ven if VPE favors interpretations involving linguistically introduced antecedents, it is indisputable that VPE allows these antecedents to be nonbounded," in the sense that they do not have to conform to strict locality constraints imposed on $\text{H}^{\sim}$ anaphora (compare the 'recency effect' discussed by Sag and Hankamer (1984)). He provides the following example:

(7.27) Italian authorities apparently figured that the lure of a lot of cash might $[_{\text{VP1}}$ tempt Liceo Gelli to $[_{\text{VP2}}$ show his face in Europe, where they could $[_{\text{VP3}}$ get their hands him]]]. Last week, in any case, it did $[_{\text{VP1}}$ __], he did $[_{\text{VP2}}$ __], and they did $[_{\text{VP3}}$ __]. (NYT Sept 19, 1982)

Hardt (1993) More arguments for the pragmatic control of VPE are provided by Hardt (1993). In particular, he gives many examples demonstrating nonparallelism between the ellipsis and the antecedent. Some of his examples involving nominal antecedents are given below (Hardt, 1993, §2.11.3):

[13] We will concentrate on VPE here. See Chao (1987, §4.3) for arguments for the deep anaphora status of Sluicing.

[14] As far as VPE's ability to be pragmatically controlled is concerned, Chao (1987, §4.3.2) considers examples similar to those provided by Schachter (1977) but, in view of Hankamer's (1978) reply to Schachter, he is noncommittal about their relevance.

(7.28) David Begelman is a great **laugher**, and when he *does*, his eyes crinkle at you the way Lagy Brett's did in The Sun Also Rises. (p.90, *You'll Never Eat Lunch in This Town Again*, Julia Philips)

(7.29) We should suggest to her that she officially appoint us as a committee and invite faculty **participation**. They *won't*, of course...

(7.30) Meanwhile, they sense a drop in **visitors** to the city. Those who *do*, they say, are not taking cabs. (Chicago Tribune, 2/6/92)

Furthermore, Hardt (1993) provides examples of active/passive mismatches, which, although predicted ungrammatical on Hankamer and Sag's (1976) account, are fully acceptable.[15]

(7.31) This information could have been released by Gorbachov, but he chose not to. (Daniel Schorr, NPT 10/17/92)

(7.32) Business needs to be developed differently than we have in the past. (5/24/91 NPT "Morning Edition" interview)

(7.33) A lot of this material can be presented in a fairly informal and accessible fashion, and often I do. (Chomsky, 1982, p.41)

(7.34) HARRY they fired, although it was TOM who should have been.

On the basis of these, and other observations mentioned in §7.3.2.3, Hardt (1993) concludes that an elliptical VP is a proform, i.e., it has no internal structure and its meaning is recovered by essentially pragmatic (discourse-oriented) conditions.[16]

Summary In summary, Chao (1987) and Hardt (1993) reanalyse VPE (and Sluicing) as deep anaphora (leaving Stripping and Gapping as core cases of surface anaphora). The former shows that such properties as whether the elliptical clause contains a head (in the relevant sense), whether the missing material is a single constituent (rather than a discontinuous string of constituents), boundedness, etc. classify VPE (and Sluicing) together with deep anaphora, and also suggests that the surface parallelism judgements are not as clear as Hankamer and Sag's (1976) theory would predict. The latter adduces other nonparallelism arguments for this stance and analyses VPE by means of discourse properties.

In the next section we will see how *do so* anaphora fits into the surface/deep dichotomy discussed above.

7.2.2 *Do So* as Surface Anaphora

Hankamer and Sag (1976) show that *do so* cannot be pragmatically controlled and, hence, analyse it as a case of surface anaphora (Hankamer and Sag, 1976, §4.2).

[15] Some such examples can be found as early as in Kaplan (1976, pp.264–265), but, as far as we can see, they were unnoticed or ignored at that time.

[16] Hardt (1993, §2.5) also refutes Chao's (1987) claim that some cases of VPE involve syntactic reconstruction.

(7.35) [Hankamer again attempting to pass 12″ ball through 6″ hoop]
Sag: #I don't think you can *do so*.

They also try to show that *do so* (or *so* in general) behaves like a deep anaphor in all other respects (cf. §7.2.1.1). Thus, the example (7.36) shows that *so* may contain the missing antecedent, (7.37) shows that *do so* preserves the consistent/contradictory ambiguity, and (7.38) illustrates the surface parallelism requirement.

(7.36) I didn't ride a camel, but Ivan must have *done so*, and now our office is infested with its fleas.

(7.37) We expected John to claim that the earth is larger than it is, and he *did so*.

(7.38) a. Nobody else would take the oats down to the bin, so Sam *did so*.
b. *The oats had to be taken down to the bin, so Sam *did so*.

As we saw in §7.2.1.2, Williams (1977b) takes issue with Hankamer and Sag's (1976) theory; in fact, he puts some emphasis on the *so* facts. In particular, he shows that in contexts in which *so* allows missing antecedents, also other anaphors, which Hankamer and Sag (1976) would have to classify as deep (*something along those lines*, *something like that*), do.

(7.39) Ivan, have you ever ridden a camel?
I believe you might say *so* / *something along those lines* / *something like that*; at least, I sat on its back while it walked.

Moreover, Williams (1977b) notes that in some contexts, *so* does not preserve the sensible/contradictory ambiguity:

(7.40) John said that Bill was taller than he was, but Mary didn't say *so*. (sensible)

Nevertheless, since Sag (1979) and Sag and Hankamer (1984) drop 'missing antecedents' and 'sensible/contradictory ambiguities' as tests for deep/surface anaphora, and since they emphasize the syntactic parallelism correlation (which Williams (1977b) does not discuss), Williams's (1977b) criticism does not conclusively refute the status of *do so* (or *so* in general) as a surface anaphor. In fact, both Sag (1979) and Sag and Hankamer (1984) capitalize on surface parallelism (7.38) and reiterate their position on *do so* as surface anaphora. For this reason, when refuting the surface status of *do so* in §7.3, we will concentrate on syntactic parallelism.

Before we conclude this section we should mention that Chao (1987, pp.131–132,175) considers *do so* as 'discourse oriented' (i.e., deep) anaphora, contra Hankamer and Sag (1976) and Sag and Hankamer (1984), but in accordance with the main claim of §7.3. For him, this is a necessary conclusion from 1) classifying all anaphors as H^+/H^- according to whether they contain the head (in the relevant sense), and 2) claiming that H^+ anaphors are essentially the deep anaphors. Unfortunately, Chao (1987) does not provide independent arguments for this position.

7.3 Against the *Do So* Test

In this section, we will provide conclusive arguments against the *do so* substitution as a test for configurational distinction between complements and adjuncts. First, in §7.3.1, we will recall arguments from Miller (1990, 1992) against the *do so* test, and then, in §§7.3.2–7.3.3, we will adduce extensive arguments for the stance that, adopting Hankamer and Sag's (1976) division of anaphoric processes into 'deep' and 'surface', *do so* must be analysed as deep anaphora. In particular, we will first (§7.3.2) show that cases of nonparallelism involving *do so* can easily be constructed and found in corpora (if one only makes a serious attempt at *doing so*!); and, second (§7.3.3), we will argue that interpreting *do so* involves nontrivial pragmatic inferences. Since the *do so* test makes sense as an argument for the configurational understanding of the complement/adjunct dichotomy only on the treatment of *do so* as a surface anaphor, this will provide a strong argument against the test.

7.3.1 Miller (1990, 1992)

The basis of the *do so* test is the claim that what *do so* refers to is the meaning of a V′, i.e., minimally, the meaning of the a verb together with all its arguments. Miller (1990, 1992) shows that this does not have to be the case. Consider examples (7.41)–(7.43) below (Miller, 1992, pp.96–97).

(7.41) John kicked Mary and Peter *did so* to Ann.

(7.42) John spoke to Mary and Peter *did so* to Ann.

(7.43) John spoke to Mary and Peter *did so* with Ann.

In all these examples, what *did so* refers to is the meaning of the verb, and not the meaning of the V′. If the latter were the case, *did so* could not be modified by *with/to Ann*.

Miller (1990, 1992) notes that "the relevant factor for acceptability of a PP complement after *do so*, *do it*, *do that*, is not whether or not the corresponding complement of the antecedent verb is within the VP [V′] of the antecedent, but whether or not the PP complement is acceptable as a complement for main verb *do* with a thematic role compatible with that which the corresponding complement of the antecedent verb has with respect to the antecedent verb" (Miller, 1992, p.96). This claim is supported by the following examples in which the thematic role of the PP dependent of *did so* is incompatible with the thematic role of the complement of the antecedent verb. In all of (7.44)–(7.46) this results in the deterioration of acceptability.

(7.44) ??John kicked Mary and Peter did so for Ann.

(7.45) ??John spoke to Mary and Peter did so for Ann.

(7.46) ??John went to Rome and Peter did so to Rome.

Note that although the acceptability of examples such as (7.41)–(7.43) seems sufficient to pronounce the demise of the *do so* test, it could still be resurrected by analysing *do so* as surface anaphora, adopting the replacement of the syntactic identity condition for deletion by the identity of logical forms (close to the syntax) proposed by Sag (1976, 1979), and allowing an exceptional operation of abstraction driven by information structure (similar to that postulated by Akmajian (1973), but, say, in the spirit of Webber (1979)).[17] In the ensuing sections, we will endeavour to show that this syntactic view on *do so* cannot be reasonably maintained.

7.3.2 Nonparallelism of *Do So*

Recall (§7.2.1) that syntactic parallelism turned out to be the core characteristic of the surface anaphora, which, apart from the unavailability of deixis, distinguishes it from deep anaphora. In this section, we will see that *do so* readily permits surface nonparallelism.[18]

7.3.2.1 Passive Antecedents

Examples of active/passive mismatches involving *do so* anaphora abound. We first present examples found in various nooks and crannies of linguistic literature, and then adduce numerous specimens from corpora, WWW sites, and other sources. Before we do that, though, we should apologize to the patient reader for the number of examples involving active/passive mismatch that we reproduce here. It has been said that "extraordinary claims require extraordinary proofs." Since the belief in the syntactic nature of *do so* substitution is so strongly entrenched in the linguistic lore, we feel obliged to show that the arguments for the contrary stance are not based on rare or exceptional data.

Examples Found in the Literature The first to note the possibility of active/passive mismatches was, as far as we know, Bouton (1969). He claims that examples such as (7.47)–(7.48) are acceptable for some English speakers (who he calls 'passivists'):

(7.47) Mary was $\left[\begin{array}{c}\text{contacted}\\\text{telephoned}\\\text{insulted}\end{array}\right]$ by the same man in Boston who had *done so* in New York.

(7.48) Because the issue had been discussed so thoroughly in our committee that afternoon, we were asked not to waste time *doing so* again that night.

Kaplan (1976, p.250) provides (7.49) (*inter alia*), which, he claims, is (almost) fully acceptable for almost anybody. Note that (7.49) is similar to (7.47).[19]

(7.49) Mary was contacted last night by the same man who had *done so* before.

[17] See §7.3.3.1 below on such exceptional operations on logical form.

[18] This was independently pointed out also by Kehler (1995, §5.2.4) and Kehler and Ward (1995).

[19] Kaplan (1976, p.221) also rejects Bouton's (1969) claim that there exist two dialects: one for which (7.47)–(7.48) are fully acceptable, and another one, for which they are totally unacceptable. For him all these sentences are acceptable to varying degrees.

Dalrymple *et al.* (1991) provide a nonprocedural analysis of interpretive possibilities of ellipsis which presupposes finding the logical formula for the source of ellipsis. Dalrymple *et al.* (1991) do not deal with this issue themselves but mention that this may be a nontrivial task and give, *inter alia*, the following examples of active/passive mismatches:

(7.50) The formalisms are thus more aptly referred to as information- or constraint-based rather than unification-based, and we will *do so* here. (Shieber, 1989, p.2)
do so = refer to the formalisms as...

(7.51) It is possible that this result can be derived from some independent principle, but I know of no theory that *does so*. (Mohanan, 1983, p.664)
does so = derives this result from...

The following examples come from Kehler and Ward (1995) (and Kehler (1995)).

(7.52) Section 1 provides the examples to be derived by Gapping, and a formulation of Gapping capable of *doing so*. (Neijt, 1981)
doing so = deriving the examples by Gapping

(7.53) As an imperial statute the British North America Act could be amended only by the British Parliament, which *did so* on several occasions. (Groliers Encyclopedia)
did so = amended the BNAA

Finally, Meijs (1984) reports results of search for *do so* constructions in two corpora: the American English Brown corpus, and the British English LOB corpus. Among various examples that he produces are the following:

(7.54) For the only time in the opera, words are not set according to their natural inflection; to *do so* would have spoiled the dramatic point of the scene. (Brown N 09 1310)
do so = set words according to their natural inflection

(7.55) Certainly external forces should not be applied arbitrarily out of mere power available to *do so*. (Brown G 22 1550)
do so = apply external forces

(7.56) The first reiterated the command that Bismarck was to be kept informed of the course of military operations, and directed Moltke to take such effective steps to *do so* that Bismarck would have no further cause for complaint. (LOB J 57 03)
do so = keep Bismarck informed...

(7.57) The intention behind the legislation was to insure that the money should be used for reinstatement wherever it was possible and economic to *do so*... (LOB H 05 06)
do so = use the money for reinstatement

(7.58) They had been married for six years, but the salary raise, on the expectation of which they had *done so*, had not materialised. (LOB M 02 85)
done so = married

This brings us seamlessly to other examples of active/passive mismatch found in corpora.

Examples Found in Corpora The examples below come from the COBUILD corpus.[20]

(7.59) <p> However painful to the victims and their relatives, it should be obvious that every last villager who torched his neighbour's house will not be indicted. To *do so* would be to set community against community once again... (N2000960217)
do so = indict them

(7.60) After a four-day meeting of the national Shengo, the Ethiopian parliament, it was also decided that the country's economy should be placed on a war footing. But in *doing so* the government also called for peace talks to be resumed. (S1000900621)
doing so = deciding that... *or*
doing so = placing the country's economy on a war footing

(7.61) But ethnic Germans, while encouraged to stay put, aren't being stopped from moving to Germany, since to *do so* would require changing the constitution... (S1000901027)
do so = stop ethnic Germans from moving to Germany

(7.62) Mr Garcia said he had known the money was deposited with the BCCI, but the decision to *do so* had been taken by the officials alone. (S1000910801)
do so = deposit the money

(7.63) Eventually a Czechoslovak-German treaty will be signed — since it is in both countries' interest to *do so*. (S1000910801)
do so = sign a treaty

(7.64) The same system applies to all day tours but note that some of them have to be booked in advance. You can *do so* by sending a fax or telex. (E0000002243)
do so = book them / a tour in advance

(7.65) While much attention was given to the bestial behaviour of the miners, the seriousness of what happened prior to their intervention needs to be emphasized. The President of the most important opposition National Liberal party, Radu Campeanu, *did so* himself when he described the attacks on government buildings as the most aggressive acts committed last week. (S1000900621)
did so = emphasized the seriousness of...

(7.66) <p> This offer is EXCLUSIVE to you, and booking can be made from our box office immediately by calling on telephone please quote your membership number. If you have not already *done so*, tickets for the performance are still available. (E0000002183)
done so = made booking

(7.67) <p> If you're the owner of a Smart Socket, which automatically routes your calls via the cheaper route, this will need to be replaced with a Smart Socket Plus, if you haven't already *done so*. (E0000002319)
done so = replaced Smart Socket with Smart Socket Plus

[20] <p> marks the beginning of a paragraph.

(7.68) The British Prime Minister Margaret Thatcher went to the Dublin Summit of European Community leaders with the message that at least some sanctions against South Africa ought to be lifted. Britain has *done so* unilaterally already, in relatively minor areas such as tourism promotion. (S1000900621)
done so = lifted some sanctions against South Africa

(7.69) <p> The recommendations of the 1991 report, which urged increased funding for Queensland councils, was rejected by the Federal Government the first time it had *done so* in the 14-year history of the Grants Commission. (N5000951115)
done so = rejected the recommendations

The next example comes from the Brown corpus:

(7.70) My answer to the first part of his question is that in the few weeks that I have had my present portfolio, two or three times in public I have stated my firm belief that it is in the interests of the people of Northern Ireland, the police and the security forces – indeed, in the interests of all of us – that the law be applied even-handedly and that those responsible for applying the law should *do so*. (HHV 15196)
do so = apply the law even-handedly

Finally, some more examples are extracted from various WWW pages:[21]

(7.71) Compaq will not be unseated as the market leader any time soon, but IBM does not have to *do so* to be successful. (WWW-1)
do so = unseat Compaq

(7.72) Here is a somewhat random selection of User Groups and User Group people. Look for it to become a little better organized and indexed over time. If you would like to have a page of yours linked as either a User Group or a User Group person, I would be happy to *do so*. (WWW-2)
do so = link a page of yours as…

(7.73) Other factors need to be considered, e.g., increased legal liability, changes in accounting standards, volatility of exchange rates, frequently changing and complex tax laws, etc., but this is not the place to *do so*. (WWW-3)
do so = consider other factors

(7.74) After college life returned to normal, no action was taken on Wayland's 1841 report, probably because there seemed to be no pressing reason to *do so*. (WWW-4)
do so = take action

(7.75) Since the images are accessed through the Internet, which is not secure, we were concerned that the Vatican's images might be used by those who had no right to *do so*. (WWW-5)
do so = use Vatican's images

[21] See §7.5 below for URLs (addresses) of these web pages.

(7.76) Fate, luck, providence, whatever, had those control monkeys in the same room, so even though the experiment wasn't designed to *do so*, something vastly more important and interesting was brought to light. (WWW-6)
do so = bring something... to light

(7.77) Finally, Hume believed that a hierarchical social structure could be justified in moral terms, and to *do so* he appealed to his ideas in moral philosophy. (WWW-7)
do so = justify a hierarchical structure...

(7.78) Any and all bids or offers may be rejected when it is in the recipient's interest to *do so*. (WWW-8)
do so = reject them

(7.79) The Court held that "quarrying, as a nonconforming use, cannot be limited to the land actually excavated at the time of enactment of the restrictive ordinance because to *do so* would, in effect, deprive the landowner of his use of the property as a quarry" (WWW-9)
do so = limit "quarrying"...

(7.80) If Congress had intended that payments under § 914(e) be treated as fines or penalties, it would surely have *done so* by referring to them as such or would have directed these payments to the special fund. (WWW-10)
done so = treat those payments as as fines or penalties

(7.81) These parties also reject the claim that section 251 takes precedence over section 2(b).(124) They note that section 2(b) was not amended by the 1996 Act, although prior version of the bills would have *done so*. (WWW-11)
done so = amend section 2(b)

(7.82) But the soft money loopholes, the big-picture stuff, really should be, I think, examined by Janet Reno. Common Cause and others have asked her to *do so*. (WWW-12)
do so = examine the soft money loopholes...

(7.83) In 1992, Bland and Chapman sold Hearne Hill again, this time to BOOKER GOLD EXPLORATIONS. Bland and Chapman sold to BOOKER GOLD because they wanted to see the entire property thoroughly explored instead of just the known enriched breccia zone. Surprisingly, no owner had yet *done so*, despite the indications, and despite the fact that experts in the field had recommended further exploration on Hearne Hill. (WWW-13)
done so = explored the entire property

We also found one example of what seems to be a passive *do so* with an active antecedent:[22]

(7.84) get out before 7:00 PM if not captured by then. finish "3 Bridges" sector 39 if not *done so* on day 2. (WWW-14)
done so = finished

[22]Compare it to (7.34) above. Admittedly, it is not utterly clear whether *not done so* in (7.84) stands for 'it wasn't done so' or 'you haven't done so'.

This is not as unexpected as might be thought. Contrary to occasional claims in the literature, *do so* can be passivized. Here are just some of the naturally occurring instances we have found:

(7.85) For the high-speed larger runs that the Heidelberg is capable of, plates are generated but are *done so* right on the press! (WWW-15)
done so = generated

(7.86) Seller Representation. All properties placed with our company exclusively for sale are *done so* under our agreements with the Greater Atlanta listing services; (WWW-16)
done so = placed...

(7.87) Copyrighted material displayed in these pages is *done so* for archival purposes only and is not intended to infringe upon the ownership rights of the original owners. (WWW-17)
done so = displayed

(7.88) I/We understand that the contractors pollution coverage written under this policy provides coverage on a claims made and reported basis for only those claims that are first made against the insured and reported in writing to the company during the policy even though the other coverages provided are *done so* on an occurrence basis. (WWW-18)
done so = provided

(7.89) In Perl, values are normally "immortal" — that is, they are not freed unless explicitly *done so* (via the Perl undef call or other routines in Perl itself). (WWW-19)
done so = freed

(7.90) All items quoted in whole or in part are *done so* under the Fair Use Provision of the Copyright Laws of the United States Penal Code. (WWW-20)
done so = quoted

Examples From Other Sources Finally, we present some cases of active/passive mismatches that we have come across in various publications.

(7.91) In Section 5, I will show that such examples can be treated with respect to the same formal meaning representation language as before, but *doing so* requires abandoning a static view of verb phrase ellipsis. (Webber, 1979, p.4-4)
doing so = treating such examples...

(7.92) We have seen extensively that such compositional structure can be discovered and formalized, and that there are numerous theoretical advantages to *doing so*, in both the lexical and the extralexical domains. (Jackendoff, 1990, p.283)
doing so = discovering and formalizing...

(7.93) Note that although Jackendoff (1990:195) suggests that the for-PP can be given precisely such an event interpretation, he provides no formal mechanism for *doing so*... (Verspoor, 1997, p.77)
doing so = giving the for-PP precisely such an event interpretation

(7.94) I will argue in Chapter 3 that the semantics of prepositional phrases should in many cases not be ignored even for verbs which obligatorily subcategorise for them. This has also been suggested by Gawron (1996). *Doing so* misses generalisations which can be made about the PPs... (Verspoor, 1997, p.40)
doing so = ignoring the semantics of prepositional phrases

(7.95) In France and Germany, for example, pregnant women were given their husband's clothes during labor in the belief that *doing so* would transfer the wives' pains to their husbands. (Brott and Ash, 1995)
doing so = giving pregnant women their husband's clothes

(7.96) He was speaking after the trial was formally opened by Supreme Court Chief Justice William Rehnquist, dressed in flowing black robes with gold bands on each sleeve. He *did so* from his seat in the centre of the Senate rostrum, calling each of the 100 senators by name to swear the oath. (TT, January 8, 1999)
did so = open the trial

In view of the abundance of active/passive mismatches, the claim that *do so* requires a syntactically parallel antecedent (cf. §7.2.2 above) cannot be reasonably maintained, nor can these mismatches be explained away as occasional processing errors. Of course, the relative unacceptability of some cases of such mismatches, for example (7.38b) on p.289, remains to be explained.[23]

7.3.2.2 Nominal Antecedents

Cases of surface form mismatch between *do so* and its antecedent are not restricted to voice. In this subsection, we provide some examples of *do so* referring to the meaning introduced by a nominal element.

Meijs (1984) finds the following two examples of *do so* referring to a meaning provided by a nominal:

(7.97) Its cord was useless in effect, so I'd no trouble in its removal, on *doing so* I was dumbfounded by its unexpected contents. (LOB L 15 41)
doing so = removing its cord

(7.98) Beyond that, Allied disagreement about military intervention in Laos despite warnings that they might *do so* allowed Moscow to carry out with impunity a series of military and diplomatic moves... (Brown A 34 1170)
do so = intervene in Laos

Another pair of examples comes from Kehler and Ward (1995) (and from Kehler (1995)):

(7.99) The defection of the seven moderates, who knew they were incurring the wrath of many colleagues in *doing so*, signaled that it may be harder to sell the GOP message

[23] Ivan Sag (p.c., 11 March 1998) mentions that such examples might be more acceptable than it was originally assumed in Hankamer and Sag (1976).

on the crime bill than it was on the stimulus package. (WP)
doing so = defecting

(7.100) Even though an Israeli response is justified, I don't think it was in their best interests to *do so* right now. (provided by Dan Hardt)
do so = respond

The following examples were extracted from the COBUILD corpus.

(7.101) The blind adherence of this Government to the dictates of Brussels, when no other member state attempts to *do so*, has ruined the British meat industry. (N2000951118)
do so = adhere to the dictates of Brussels

(7.102) The Independent says the departure from the Communist Party of the reform faction would be far more significant than its limited numbers may suggest. The paper says that if they *did so*, they might begin to construct the first viable, organised opposition to the communist establishment. (S1000900702)
did so = depart from the Communist Party

(7.103) They have not defined the conditions of the withdrawal or offered any indication that they will *do so* under the rules and laws of war... (S2000910226)
do so = withdraw (?)

And finally, three more examples from WWW pages:

(7.104) Reimbursement. Under this method, the recipient requests reimbursement for costs incurred during a time period. After approval of the request by the grants officer designated to *do so*, the DoD payment office reimburses the recipient by electronic funds transfer or check. (WWW-21)
do so = approve the request

(7.105) I'm still toying with my LINKS PAGE. I've moved a good deal over to my new-and-improved AMUSEMENTS AND DIVERSIONS page. So if you do want a decent escape from this mediocre page, you are welcome to *do so*. (WWW-22)
do so = escape / make an escape

(7.106) My husband insisted on our placing the baby to the children's home. I *did so* and worked there as a nurse. (WWW-23)
did so = place the baby to the children's home[24]

7.3.2.3 Other Cases of Syntactic Nonparallelism

Two final kinds of syntactic nonparallelism involve gapped antecedents and causative/inchoative mismatches.

[24]Note that *placing* is a nominal gerund here: it is modified by the possessive *our* and it cannot be modified by an adverbial (*our quick/*quickly placing the baby...*).

Gapped Antecedents Another problem for the treatment of *do so* as a surface anaphor is that the antecedent may contain a gap (a free variable).[25]

(7.107) Complex sentences are hard to write unless you are really motivated to *do so.*

(7.108) John is a man who Mary spanks. She doesn't *do so* very often, though.

The problem such examples pose for the 'surface anaphora' approach is that *do so* is expected to also contain a gap (i.e., a free variable). On the approach of Sag (1976, 1979) free variables within the anaphor (here: *do so*) are allowed only if they are bound by the same operator token which binds the variable in the antecedent. However, neither *complex sentences* in (7.107), nor *John* in (7.108) bind the variables in the respective *do so*'s. Hence, examples (7.107)–(7.108) are predicted to be ill-formed.[26]

Some naturally occurring sentences involving a gapped antecedent of *do so* are given below.

(7.109) My current indexer/browser programs assume that the free-text database is a single file. That assumption is straightforward to lift, and I plan to *do so* soon. (WWW-24)
do so = lift that assumption

(7.110) Valentine had been Chernoi's lover, engineer, confidante before Aaron, in the desperation of his need and loss, came between them. "I hold you to her standard." It struck him suddenly just how much he was asking her to sacrifice, how surprising it was that she would *do so.* (WWW-25)
do so = sacrifice that much

(7.111) They need a roof over their heads, constructive guidance, the opportunity to train for a job and a lot of love. <p> This is exactly what the YMCA has and will continue to provide. Yet we can't *do so* alone — we desperately need your help now. (COBUILD E0000000001)
do so = provide this

(7.112) The interception of planes attempting to break any air embargo was an option diplomats at the United Nations including the Americans appeared to have ruled out. President Bush, while circumspect, declined to *do so.* He said the matter was still being debated inside his administration and with other countries. (COBUILD S1000900921)
do so = rule out this option

(7.113) One question I think I have to ask you — and many people must have *done so* before: when you have such a dominant, massive figure remaining in your Cabinet, to what extent can you really be Prime Minister? (COBUILD S1000901102)
done so = asked you this question

[25](7.107) is Kaplan's (1976) (46b), (7.108) is based on his (19), reproduced below as (i).

(i) *John is a man who Mary spanks often and he is also a man who she does so passionately.

[26]This paragraph owes much to a similar discussion concerning VPE by Hardt (1993, §4.3).

(7.114) Puzzle-solving theories argue that the sound structure of a language is a puzzle which each child has to slowly solve, and that until it has *done so*, deformations will remain. (Aitchison, 1994)
done so = solved the puzzle

Similar cases, but involving VPE, are discussed also by Hardt (1993, §2.4). He notes that in case of VPE with a gapped antecedent, "a trace might switch its referent at the ellipsis site," as illustrated by (7.115)–(7.117).

(7.115) China is one of many Asian countries that Joe doesn't want to visit __. In the case of India, he does.

(7.116) There are many Asian countries that Joe doesn't want to give money to __. In the case of India, I KNOW he won't.

(7.117) There are many Asian countries that Joe doesn't want to give money to __. Some countries already know that he won't.

This, again, is unpredicted under the treatment of VPE as surface anaphora: as mentioned above, the free variable within the ellipsis site is expected to be bound by the same operator which binds it in the antecedent, i.e., 'many Asian countries' in (7.115)–(7.117).

Also *do so* anaphora exhibit such a reference switch:

(7.118) There are many Asian countries that Joe wants to visit __ sooner or later. In the case of India, he'll *do so* this year.

(7.119) Some theorems are hard to prove __, but, as far as my completeness theorem is concerned, I expect to *do so* today.

(7.120) I don't know who you want to talk to, but if it's the president, you'd better *do so* tactfully.

Thus, Hardt's (1993) arguments against lambda-based treatments of VPE, such as the surface anaphora approach of Sag (1976, 1979) and Sag and Hankamer (1984), carry over to *do so* anaphora.

Causative/Inchoative Mismatches We close this section by recalling some cases of causative/inchoative mismatch discussed by Bouton (1969) and Kaplan (1976).

(7.121) ?The young men we marched into battle sang Yankee Doddle as they *did so*.

(7.122) ?The needle the current is oscillating at 40 mgc has never *done so* before.

(7.123) ?The metal the damp weather rusted *did so*, in spite of heavy coating of grease.

(7.124) ?We planned to sink the boat, but we didn't want it to *do so* while anyone was on it.

(7.125) ?Charlie tried to curve his next pitch over the inside corner, and it *did so* beautifully — knee high!

(7.126) ?The wheel the steam rotated *did so* much more steadily than the one driven by the wind.

Such examples are claimed by Bouton (1969) to be grammatical in one dialect of English and ungrammatical in another. Kaplan (1976), on the other hand, says that they are acceptable to a certain degree in most English dialects. Since our informants judged such examples less grammatical than those of the other kinds of nonparallelism, and because we have not found any examples of this kind in corpora, we ignore them here.

7.3.2.4 Summary

As we saw in §7.3.2.1, *do so* readily admits passive antecedents, contra its treatment as surface anaphora. Also nominal antecedents are attested §7.3.2.2, although some speakers judge such examples as not fully acceptable. Finally, §7.3.2.3 contains examples of some other cases of surface nonparallelism. Although the most striking is the acceptability of numerous cases of active/passive mismatch, none of those kinds of nonparallelism can be easily dealt with on the assumption that *do so* is a surface anaphor.[27] We adduce further arguments for the deep anaphora status of *do so* in the ensuing section.

7.3.3 Pragmatic Character of *Do So*

In this section we will show more complicated cases of surface nonparallelism. In fact, we will show that, in many cases, the mechanism of finding the correct interpretation for *do so* is fed by conceptual (pragmatic) rules of inference and generalization. Thus, unless one is prepared to believe that for each conceptual representation in our mind there is also a syntactic one, *do so* must be analysed as referring to conceptual objects.

We will first (§7.3.3.1) recall simple cases of constructing the antecedent of *do so* 'on the fly' noted as early as by Nash-Webber and Sag (1978) and Webber (1979). Then (§7.3.3.2) we will show similar but more complicated cases which would require adding additional 'rules of semantic interpretation' to those posited by Nash-Webber and Sag (1978) and Webber (1979). Finally (§7.3.3.3), we show that any attempt at saving Nash-Webber and Sag's (1978) approach is hopeless: the 'rules of semantic interpretation' would have to include general pragmatic mechanisms of generalization and inference and, hence, would in no sense create 'logical forms close to syntax'.

[27] We ignore here some other apparent cases of nonparallelism, most notably polarity mismatches of the kind shown below, which *can* be treated within the framework of Hankamer and Sag (1976) (after taking into account the improvements by Sag (1976, 1979)).

(i) She was allowed to pose briefly for the cameras but answer no questions, nor indeed did she seem anxious to *do so*. (COBUILD S1000900716)
do so = answer questions

7.3.3.1 Nash-Webber and Sag (1978) and Webber (1979)

Certain cases of apparent nonparallelism (of logical forms) of a surface anaphor (in this case, VPE) and the antecedent are discussed by Nash-Webber and Sag (1978) and Webber (1979). Nash-Webber and Sag (1978) provide example (7.127), in which the controller of the anaphor is split between two VPs.

(7.127) She walks and she chews gum.
Jerry does __ too, but not at the same time.

In order to accommodate such examples into the identity of logical forms approach, Nash-Webber and Sag (1978) postulate an "optional rule of semantic interpretation" which converts the representation (7.128a) into (7.128b).

(7.128) a. $\langle\langle a\langle\lambda x\langle\phi\rangle\rangle\rangle \ \&\ \langle a\langle\lambda x\langle\psi\rangle\rangle\rangle\rangle$
b. $\langle a\langle\lambda x\langle\phi \ \&\ \psi\rangle\rangle\rangle$

This rule, when applied to the logical form of the first sentence of (7.127), i.e., to $\langle\langle \text{she}\langle\lambda x\langle \text{walk}(x)\rangle\rangle\rangle \ \&\ \langle\langle \text{she}\langle\lambda x\langle \text{chew}(x, \text{gum})\rangle\rangle\rangle$, gives the logical form $\langle \text{she}\langle\lambda x\langle \text{walk}(x) \ \&\ \text{chew}(x, \text{gum})\rangle\rangle\rangle$, which is identical to the logical form of the ellipsis __ in (7.127).

However, as noted by Webber (1979, §4-5), there are also other, more complicated instances of inference necessary to interpret VPE correctly.

(7.129) Wendy is eager to sail around the world and Bruce is eager to climb Kilimanjaro, but neither of them can __ because money is too tight.
__ = do what s/he is eager to do

(7.130) Irv and Martha wanted to dance together, but Martha's mother said that she couldn't __.
__ = dance with Irv

(7.131) The country that Joe wants to visit is China, and he will __ too, if he gets an invitation there soon.
__ = visit China

(7.132) China is a country that Joe wants to visit, and he will __ too, if he gets an invitation there soon.
__ = visit China

Webber (1979) provides tentative 'rules of semantic interpretation' necessary to handle such cases,[28] but acknowledges that "there seem to be no hard and fast rules delimiting the class of productive inferences to verb phrase ellipsis" (Webber, 1979, p.4-38).

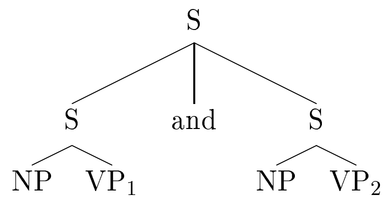
It should be noted that examples analogous to (7.127), (7.129)–(7.132) but involving *do so* anaphora are also acceptable. Below we present other cases of inferences involving *do so*.

[28] More precisely, she provides rules for (7.131)–(7.132) (as well as (7.127)) only.

7.3.3.2 Split Antecedents

The 'rule of semantic interpretation' (7.128) works only for the simplest cases of split antecedents, i.e., for those cases in which the two VPs contributing to the new logical form are (schematically) in the following configuration:

(7.133)



It is clear, though, that split antecedents may involve many other, more complicated configurations. Indeed, the only constraint seems to be that the phrases containing these VPs be in some sense parallel. The VPs themselves can be embedded much deeper than the configuration (7.133) would allow. This is illustrated by the following two examples from Meijs (1984), particularly by (7.135), in which the VPs are embedded in two relative clauses.

(7.134) What I am suggesting is that when we delay, or when we fail to act, we *do so* intentionally... (Brown H 18 350)
do so = delay or fail to act

(7.135) To the degree, however, that Schiller emancipates nature from reason, to the degree that he "breaks through the Kantiam dogma", as Baumecker asserts with approval, he *does so* without adequate systematic justification. (LOB J 53 34)
does so = emancipates... and breaks through...

Another example of a similar type comes from a WWW page:

(7.136) If a reader chooses to stop reading documents from an author who is not up to scratch; if a reader switches to a more capable UA; they are perfectly entitled to *do so*. (WWW-26)
do so = stop reading... and switch to...

The following token was uttered by Barry Norman in his review of a film by Woody Allen.

(7.137) ...featuring people (like Woody Allen himself) who can't sing and can't dance, but *do so* anyway. (Norman, 1998)
do so = sing and dance

Note that it would be difficult to build precise semantic rules allowing for such split antecedents. The first approximation of such a rule seems to be that, once the relevant VPs are abstracted, the logical forms of the clauses containing them are identical. More formally, from $[\lambda P\ \phi(P)](Q_1) \oplus [\lambda P\ \phi(P)](Q_2)$ (where $\oplus$ is any conjunction), one should be able to make the meaning of $Q_1 \& Q_2$ available for subsequent referral by *do so*. This might work for the examples above, but it is clear that the notion of identity of logical forms is too strong. Thus, the example below seems to be as grammatical as (7.136) above.

(7.138) If a reader wants to stop reading these documents; if a reader prefers switching to the other ones; they are perfectly entitled to *do so*.
do so = stop... and switch...

The logical forms achieved by abstracting the meanings of 'stop reading these documents' and 'switching to the other ones' are similar, but not identical; they differ by the predicates *want* and *prefer*. Moreover, it seems that VPs from different levels of embedding can be merged:

(7.139) a film featuring people who obviously can't sing and who know perfectly well they can't dance, but who *do so* anyway
do so = sing and dance

In fact, if sentences such (7.140) below are grammatical, it is doubtful whether the parallelism constraint on split antecedents can be formally characterized in the syntax (or via logical forms close to the syntax).

(7.140) a film featuring people who should be forbidden to sing and who know perfectly well they will never be able to dance, but who insist on *doing so* anyway
doing so = singing and dancing

We finish this subsection by providing two more complex examples involving coordination:[29]

(7.141) Fortunately, the first person to die in 1990 and the first couple to file for divorce in 1990 were allowed to *do so* anonymously. (Roeper, 1990)
do so = die and file for divorce, respectively

(7.142) What is security? A computer is considered secure if you can depend on it to behave as you expect. Yes, this is intentionally vague. This definition depends a lot on your expectations. If you expect your data to remain unread and unmodified by others and no one is able to *do so*, then your machine is considered secure. (WWW-27)
do so = read or modify your data

In the next subsection, we show that constructing an antecedent for *do so* requires nothing short of general pragmatic mechanisms.

7.3.3.3 Pragmatically Controlled Antecedents

Generalization Consider example (7.143).

(7.143) Kohl, Europe's longest-serving statesman, won the last general election in 1994 after trailing badly in the polls beforehand. Despite widespread disenchantment with his rule and unemployment nudging a post-war record of 5m, he could yet *do so* again. (TST, February 22, 1998)
do so = win a general election (after trailing badly in the polls beforehand)

[29] (7.141) is cited by Dalrymple *et al.* (1991), (7.142) was found on a WWW page. Admittedly, native speakers' judgements on (7.142) are less clear than on the previous examples in this section, although, at least some of them find it grammatical.

The meaning of *do so* in this example is something like 'win a general election' or, perhaps, 'win a general election after trailing badly in the polls beforehand'. However, the previous linguistic context does not contain a VP with this meaning; instead, it contains *won the last general election.* Thus, in order to understand this text, a generalization from 'win **the last** general election' to 'win **a** general election' must be made. To claim that this is done via a syntactic operation would be extending one's intuition of what syntax should be responsible for far beyond credulity.

The next example illustrates this point even more clearly. Here, in order to generalize from 'preside over **the 1965 Brighton** Congress' to 'preside over **a TUC** Congress', one has to apply the world knowledge, namely, that the 1965 Brighton Congress was a gathering of the Trade Union Congress. It is difficult to imagine a more direct argument for the pragmatic status of *do so* anaphora.

(7.144) Created a life peer by Harold Wilson in December 1964, he had earlier that year been elected chairman of the TUC and, as a Labour peer, presided over the 1965 Brighton Congress the first member of the House of Lords ever to *do so.* (COBUILD N2000960102)
do so = preside over a TUC Congress

Another nice example of the same kind, but with an additional complication in the form of the active/passive mismatch is (7.69), repeated below.

(7.69) <p> The recommendations of the 1991 report, which urged increased funding for Queensland councils, was rejected by the Federal Government the first time it had *done so* in the 14-year history of the Grants Commission. (COBUILD N5000951115)
done so = rejected the recommendations of a Grants Commission report

A spectacular example of generalization is given below:

(7.145) Words association experiments provide further evidence, where the commonest adult response is a word from the same class. Nouns elicit nouns around 80 percent of the time, whereas verbs and adjectives *do so* somewhat less strongly, with figure of just over 50 percent. (Aitchison, 1994, p.102)
do so = elicit words from the same class

It is clear from the first sentence of (7.145) that the meaning of *do so* cannot be 'elicit nouns', but rather has to be something like either 'elicit words from the same class' or 'elicit verbs and adjectives, respectively' (cf. also (7.141) above).

Some further examples of generalizations feeding the process of resolving *do so* anaphora are given below.

(7.146) 'But who else could possibly have got that poison except Celia?'
'Quite a lot of people,' said Inspector Sharpe, 'if they were determined to *do so.*

Even you yourself, Miss Tomlinson'... (Christie, 1993, p.91)
do so = get poison[30]

(7.147) RADIO 1 is to stage an historic live broadcast from the NME-backed Glastonbury Festival in June, the first time the station has ever done so. (COBUILD N0000000357)
done so = staged a live broadcast from the Glastonbury Festival

(7.148) IN TURN YOU AGREE `</h> <p> bull`; To buy at least one book of your choice from each of the first 4 magazines and continue to *do so* for as long as you decide to remain a member. (COBUILD E0000002486)
do so = buy at least one book from each magazine

(7.149) The king said he would meet Hun Sen and Ung Huot, Hun Sen's handpicked successor to Ranariddh, on Tuesday in his residence. He also will meet Chea Sim, who is acting head of state. `<p>` Sihanouk, who has described Ung Huot as a "puppet," said he still regards Ranariddh as prime minister and condemned his removal as "illegal and unconstitutional." `<p>` The king said he would not sign a royal decree approving Ung Huot as premier but also would not stop Chea Sim from *doing so*. (WWW-28)
doing so = signing a decree approving Ung Huot as premier

(7.150) Bill Clinton, when running for President in 1992, understood the educational impact of television. About a month before the Democratic National Convention, he began to televise unrehearsed question-and-answer sessions on issues raised by members of audiences who were chosen by a neutral third party. He even *did so* on MTV, in an attempt to reach the younger generation. (WWW-29)
did so = televised an unrehearsed question-and-answer session on issues raised by members of an audience...[31]

(7.151) In a study by the Alan Guttmacher Institute (the research arm of Planned Parenthood), a survey of women who have had at least one abortion revealed that 3% *did so* for reasons related to their own health; (WWW-30)
did so = had an abortion

(7.152) Over the next six years or so I've perhaps emailed a total of half a dozen or less messages to Apple execs or employees– yes, one a year (or less) on average– and some of these were only because my readers were urging me to *do so*. (WWW-31)
do so = email a message

Enriching Antecedents Antecedents to *do so* can also be created 'on the fly' by enriching the meaning of a VP occurring in the text. This is exemplified by (7.153) below.

(7.153) In order to assure the most productive use of the limited amount of time available to question witnesses, all witnesses scheduled to appear before the Subcommittee

[30] It is clear from previous context that the meaning of *do so* is 'get poison', in general, and not 'get that poison', i.e., the specific phial of poison referred to by *that poison*.
[31] See also the similar example (7.64) on p.293.

are required to submit 200 copies of their prepared statement and an IBM compatible 3.5-inch diskette in ASCII DOS Text or 5.1 WordPerfect format, for review by Members prior to the hearing. Testimony should arrive at the Subcommittee on Trade office, room 1104 Longworth House Office Building, no later than Tuesday, September 9, 1997. Failure to *do so* may result in the witness being denied the opportunity to testify in person. (WWW-32)
do so = submit 200 copies... to... by Tuesday...

The meaning of *do so* is here 'submit 200 copies of one's prepared statement... to the Subcommittee on Trade office... by Tuesday, September 9, 1997'. The VP *submit...* provides only part of this meaning, the rest is provided by the next sentence. Note that, unlike in the case of examples discussed in §§7.3.3.1–7.3.3.2 above, (7.153) does not involve simply conjoining the meanings of two VPs. Instead, it relies on the (pragmatic) knowledge that the *prepared statement* of the first sentence is the same thing as the *testimony* of the second, which allows constructing a complex meaning by enriching the VP meaning of the first sentence with the additional information provided by the second sentence.

(Truly) Missing Antecedents Finally, it is possible for *do so* to refer to meanings not introduced directly by any textual elements, but rather inferred from the text. Consider, e.g., (7.154) below.

(7.154) Many banking analysts consider Bank Niaga a very prudent bank as evident from its relatively high write-offs in the last five years to 1996. Bank Niaga has been able to *do so* on the back of strong earnings growth. (WWW-33)
do so = achieve relatively high write-offs

The meaning of *do so* in this example seems to be something like 'achieve relatively high write-offs', although there is no element introducing the meaning of 'achieve'.

An even more striking example of this kind is the following one, from the *Esquire* Magazine (September 1992). It seems that the only clue for the meaning of *done so* is provided by the phrase *out with the corks of wine.*

(7.155) <p> Anyway, there are your pears, just nicely poached, not too soft and not too hard. You know this because you have prodded one of the pieces with the tip of a sharp knife. Out with the corks of wine, assuming you haven't *done so* already, and empty it into a saucepan. (COBUILD N0000000357)
done so = opened wine

Here are some other examples of 'missing antecedents'.

(7.156) Finally, I would suggest that any of you who have clients, or contacts with individuals who are seeking a high return income opportunity of between 34–60% annual return on $50,000, the limited partnerships seem to pose an excellent opportunity to *do so*. (WWW-34)
do so = make the income of between 34–60% annual return on $50,000 (?)

(7.157) We want to have your business for a long time. This method of business is what got Marathon to this level of business performance and will continue to *do so* as long as we stay in business. Integrity, Competitive, High Tech are some of a few descriptions of the Marathon Publication. (WWW-35)
do so = keep Marathon on this level of business performance (?)

(7.158) In the scientific arena researchers routinely challenge study results by repeating experiments and seeing if they come out the same way. When asked whether R.J. Reynolds planned it own study of Joe Camel and teenage smoking habits, spokeswoman Carter said her company has no plans to *do so* at this time. (COBUILD S2000920520)
do so = conduct its own study...

7.3.3.4 Summary

In this section, we have shown that *do so* refers to conceptual (pragmatic) objects. In particular, antecedents of *do so* can be created via a process of generalization, by enriching the meaning of a VP, or via other means of inferring a missing meaning.

Of course, we do not pretend to have provided anything close to an account of *do so* anaphora. All we have done in this section is show that *do so* cannot be reasonably treated as a syntactic phenomenon but rather, since it is fed by pragmatics, it must itself be analysed as a pragmatic / discourse / conceptual phenomenon.[32] For this reason, any account of *do so* will have to adopt a consistent theory of discourse specifying exactly what operations are allowed to create new discourse entities under what conditions. We are not aware of such a theory, hence, this task is well beyond the scope of this study.[33] Indeed, we are convinced it deserves a dissertation of its own.

7.4 Conclusions

The aim of this Chapter has been to show that, contrary to the linguistic lore since Lakoff and Ross (1966, 1976), the *do so* substitution test cannot say anything about the alleged configurational difference between complements and adjuncts.

The relevance of this test could be maintained only if *do so* were treated as a case of surface anaphora in the sense of Hankamer and Sag (1976) and Sag and Hankamer (1984). We showed that out of two core characteristics of surface anaphora which survived the vicissitudes of the surface vs. deep anaphora theory, i.e., the ability of the anaphor to be used deictically and the anaphor's syntactic parallelism to its antecedent, the latter does not hold in the case of *do*

[32] An alternative would be to say that the conceptual structures created 'on the fly' are then converted to syntactic trees which, in turn, provide an antecedent for *do so*. This seems to us a desperate move to save the syntactic account not supported by any independent evidence, and, hence, we ignore it.

[33] Neither can Hardt's (1993) 'discourse-oriented' treatment of VPE deal with any of the examples in §7.3.3.3, although it can with many cases of syntactic nonparallelism. However, this is achieved with the help of specialized computational rules rather in the spirit of Nash-Webber and Sag (1978) and Webber (1979), and not via general independently motivated discourse mechanisms. Przepiórkowski (1998b) contains a very preliminary attempt at an analysis of *do so* within the Conceptual Semantics framework of Jackendoff (1983, 1990, 1997).

so. We also showed that *do so* can be pragmatically controlled in the sense that it can refer to objects created via pragmatic operations. This, together with the earlier results by Miller (1990, 1992), places very heavy burden of proof on the adherents of the surface status of *do so*.

We find it highly suggestive that the most explicit and straightforward argument for the configurational complement/adjunct dichotomy ever made in the generative literature does not stand up to scrutiny. In the next Chapter, we will see that also various alleged tests of such a dichotomy in Polish fail to provide any evidence for the syntactic understanding of the complement/adjunct distinction.

7.5 Appendix: Sources Used in §7.3

Books and newspapers:

Aitchison 1994	see Aitchison (1994) in References
Brott and Ash 1995	Armin A. Brott and Jennifer Ash, 1995, *The Expectant Father: Facts, Tips, and Advice for Dads-to-Be*, Abbeville Press
Chomsky 1982	Noam Chomsky, 1982, *Noam Chomsky on the Generative Enterprise*, Foris Publications, Dordrecht (quoted here after Dalrymple *et al.* (1991))
Christie 1993	Agatha Christie, 1993, *Hickory Dickory Dock*, HarperCollins Publishers
Jackendoff 1990	see Jackendoff (1990) in References
Mohanan 1983	K. P. Mohanan, 1983, Functional and anaphoric control, *Linguistic Inquiry*, 14(4):641–674 (quoted here after Dalrymple *et al.* (1991))
Neijt 1981	Anneke Neijt, 1981, Gaps and remnants – sentence grammar aspects of gapping, *Linguistic Analysis*, 8(1):69–93 (quoted here after Kehler and Ward (1995))
Norman 1998	Barry Norman, *Films of the Year*, BBC WORLD, January 2, 1998, 22:30–23:00 CET
Roeper 1990	R. Roeper, 1990, *Chicago Sun-Times*, 8 January, cited by James McCawley, *1990 Linguistic Flea Circus*, unpublished manuscript (quoted here after Dalrymple *et al.* (1991))
Shieber 1989	Stuart M. Shieber, 1989, *Parsing and Type Inference for Natural and Computer Languages*, Ph.D. thesis, Stanford University (quoted here after Dalrymple *et al.* (1991))
Verspoor 1997	see Verspoor (1997) in References
Webber 1979	see Webber (1979) in References
Groliers Encyclopedia	quoted here after Kehler and Ward (1995)
TST	*The Sunday Times*
TT	*The Times*
WP	*Washington Post* (quoted here after Kehler and Ward (1995))

World Wide Web pages (the `http://`-prefix removed):

WWW-1	`www.ibm.com/Servers/strategy/servstrt.html`
WWW-2	`www.best.com/~reed/ug.html`
WWW-3	`www-cepr.stanford.edu/CEPR_Publications/Perspectives.htm`
WWW-4	`www.brown.edu/Administration/University_Relations/History/III.html`
WWW-5	`www.almaden.ibm.com/journal/rd/mintz/mintzer.html`
WWW-6	`www.mindspring.com/~cinque/q6.html`
WWW-7	`www.york.ac.uk/depts/pep/ugrad/intro.htm`
WWW-8	`web.fie.com/cws/sra/dodgars.htm`
WWW-9	`www.law.cornell.edu/ny/ctap/ascii/I97_0137`
WWW-10	`www.law.emory.edu/fedcircuit/july97/96-1413.html`
WWW-11	`www.telecomweb.com/io/sec2.html`
WWW-12	`cnn.com/TRANSCRIPTS/9711/30/cg.00.html`
WWW-13	`www.bookergold.com/summary.htm`
WWW-14	`www.gamedemo.com/strategy/jaggeda/hints.txt`
WWW-15	`www.laserexpress.com/XLEDigPrinting.html`
WWW-16	`ww1.remaxhq.com/georgia/reprofil.pl/CK=1F2597B1AB`
WWW-17	`www.mikedunn.com/lynch/tppic24.html`
WWW-18	`www.necc.com/products/racapp.html`
WWW-19	`popeye.cis.mcmaster.ca/perl/perlguts.html`
WWW-20	`elanor.sci.muni.cz/ar/ar319_Sections/copyright.html`
WWW-21	`web.fie.com/cws/sra/dodgars.htm`
WWW-22	`www-leland.stanford.edu/~cm1/home.html`
WWW-23	`www.ee.gannon.edu/~frezza/zhizn/v1n1e.html`
WWW-24	`www.alumni.caltech.edu/~zimm/ftirp.html`
WWW-25	`www.klab.caltech.edu/~flowers/radiant/022.html`
WWW-26	`lists.w3.org/Archives/Public/www-style/msg05903.html`
WWW-27	`www.acm.uiuc.edu/workshops/security/overview.html`
WWW-28	`cnn.com/WORLD/9708/11/cambodia/index.html`
WWW-29	`education.indiana.edu/~frick/edsys.html`
WWW-30	`www.rnclife.org/faxnotes/1997/nov97/97-11-24.html`
WWW-31	`members.aol.com/orizon/n0697.html`
WWW-32	`www.house.gov/ways_means/tr-14.htm`
WWW-33	`www.asia1.com.sg/bagong/general/ebri/contents/19970806/cover-story.h`
WWW-34	`www.techstocks.com/~wsapi/investor/s-7910/reply-25`
WWW-35	`www.flash.net/~mpinc/intro.html`

Corpora: Brown, COBUILD, LOB.

Chapter 8

Complements and Adjuncts in Polish

We have just seen that the most famous and explicit argument for the configurational complement/adjunct distinction fails miserably when carefully scrutinized. In this Chapter, we return to Polish, the main empirical basis of this study, and show that also in this language, no arguments for positing such a configurational dichotomy are in sight.[1]

First, in §8.1 we consider verbal proform facts similar to the *do so* facts discussed in the previous Chapter. Then, in §8.2, we look at extraction of and from complements and adjuncts, and, in §8.3, we briefly consider the putative argument for the configurational complement/adjunct distinction based on parasitic gaps. After that, in §8.4 we deal with binding in Polish and argue than none of the two major theories of binding present in the current literature, both encompassing the syntactic distinction between complements and adjuncts, can easily be extended to Polish. We end with a brief note on Negative Concord in §8.5 and with the conclusion in §8.6.[2]

8.1 Verbal Proforms

In the previous Chapter, we critically examined the *do so* test and concluded that *do so* is a pragmatic anaphor, whose antecedent does not have to correspond to a textually introduced VP (or V′). Does this result carry over to Polish, or are there true verbal surface anaphors in Polish?[3]

8.1.1 Verbal Proforms in Polish

The first question we have to answer is what could the Polish equivalent of *do so* be. The most plausible candidates seem to be *zrobić to* 'do it', *zrobić tak* 'do so', *uczynić to* 'do it',

[1]Sections 8.2, 8.4 and 8.5 are revisions and extensions of Przepiórkowski (1999c); section 8.1 is based on Przepiórkowski (1999e).

[2]We postpone the discussion of case marking, which has also been claimed to correlate with the complement/adjunct dichotomy, to §10.2.

[3]This section was inspired by a suggestion of Tadeusz Zabrocki (p.c., Poznań, May 1997) that *zrobić to* may be used to distinguish complements and adjuncts in Polish.

uczynić tak 'do so'. Of the *zrobić / uczynić* pair, the latter verb is rather restricted in the neutral register; it is usually perceived as dated or formal. Moreover, the *zrobić tak / uczynić tak* pair does not seem to behave like a V′-anaphor at all:

(8.1) ?*Janek napisał pracę domową w domu, a Tomek zrobił/uczynił tak dopiero w szkole.
John wrote homework at home, and Tom did so only at school
'John wrote his homework at home, and Tom did so only at school.'

(8.2) ?*Janek poszedł do kina wczoraj, a Tomek zrobi/uczyni tak jutro.
John went to cinema yesterday and Tom do_{fut} so tomorrow
'John went to the cinema yesterday, and Tom will do so tomorrow.'

On the other hand, *zrobić to* is fully acceptable in the contexts above:

(8.1′) Janek napisał pracę domową w domu, a Tomek zrobił to dopiero w szkole.
John wrote homework at home, and Tom did it only at school
'John wrote his homework at home, and Tom did so only at school.'

(8.2′) Janek poszedł do kina wczoraj, a Tomek zrobi to jutro.
John went to cinema yesterday and Tom do_{fut} it tomorrow
'John went to the cinema yesterday, and Tom will do so tomorrow.'

Moreover, *zrobić to* does seem to distinguish complements and adjuncts just as its English cognate; compare the English (8.3a)–(8.3b), from Borsley (1991, p.61), with the Polish (8.4a)–(8.4b):

(8.3) a. Stefan will wash his socks in the bathroom and Ben will do so in the kitchen.
b. *Stefan will put his socks in the bathroom and Ben will do so in the kitchen.

(8.4) a. Stefan upierze skarpetki w łazience, a Ben zrobi to w kuchni.
Stefan $wash_{fut}$ socks in bathroom and Ben do_{fut} it in kitchen
b. *Stefan położy skarpetki w łazience, a Ben zrobi to w kuchni.
Stefan put_{fut} socks in bathroom and Ben do_{fut} it in kitchen

In the rest of this section we will concentrate on the apparent verbal proform properties of *zrobić to*.

8.1.2 Problems with the Proform Test in Polish

***Zrobić To* and the Complement/Adjunct Dichotomy** Let us assume that *zrobić to* can distinguish between complements and adjuncts in Polish the same way that *do so* is often (and incorrectly) supposed to do that in English. What are, then, the predictions of this test? We saw above (cf. (8.1′)–(8.2′)) that it predicts that locative and temporal adverbials are adjuncts, in unison with our expectations. Moreover, it also rules that the NP[*ins*] adverbials with 'instrumental' or 'means' meaning are adjuncts:

(8.5) Janek wbił gwóźdź młotkiem, a Tomek zrobił to siekierą.
John drove nail hammer$_{ins}$ and Tom did it axe$_{ins}$
'John drove the nail with a hammer, and Tom did so with an axe.'

This is in accordance with the functional and syntactic-functional criteria (C3) and (C3′) discussed in Chapter 6, which are the most common criteria for the complement/adjunct distinction, but against the iterability test (C4).

However, not all 'instrumental of means' adverbials are adjuncts according to our *zrobić to* test: NP[*ins*] adverbials of 'means of transport' are supposed to be complements:

(8.6) *Janek pojechał na konferencję pociągiem, a Maria zrobiła to samolotem.
John went to conference train$_{ins}$ and Mary did it plain$_{ins}$
'John went to the conference by train, and Mary did so by plane.' (intended)

(8.7) *Janek przesłał zaproszenie pocztą, a Tomek zrobił to e-mailem.
John sent invitation post$_{ins}$ and Tom did it email$_{ins}$
'John sent the invitation by post, and Tom did so by email.' (intended)

This is rather unexpected as in neither of the two examples above is the NP[*ins*] obligatory and, additionally, at least in (8.6), the adverbial is clearly not indispensable to complete the meaning of the verb. Thus, the test blatantly contradicts our expectations here.

Another interesting mismatch between our expectations and the results of the *zrobić to* test, involving goal clauses, is shown below:

(8.8) Janek poszedł do sklepu, żeby kupić chleb, a Tomek zrobił to, żeby kupić
John went to shop Comp buy$_{inf}$ bread and Tom did it Comp buy
wódkę.
vodka
'John went to the shop in order to buy some bread, while Tom did so to buy vodka.'

(8.9) *Janek poszedł do sklepu kupić chleb, a Tomek zrobił to kupić wódkę.
John went to shop buy$_{inf}$ bread and Tom did it buy vodka
'John went to the shop to buy some bread, while Tom did so to buy vodka.'(intended)

According to the proform test, goal clauses with the complementizer *żeby* are adjuncts, while the infinitival goal (or purpose) clauses are complements. This starkly violates both the semantic criterion (C2) and, more importantly, the functional and syntactic-functional criteria (C3) and (C3′), which predict that both kinds of goal clauses are adjuncts.[4]

The final empirical problem with the *zrobić to* test that we would like to point out here concerns malefactives and benefactives. The strong linguistic intuition is that both the malefactive

[4]On the other hand, infinitival purpose clauses are much more restricted than *żeby*-goal clauses, which might suggest that the former are in a sense more complement-like than the latter; see the 'co-occurrence criterion' cited in §6.3.1 above. See also Baxter (1999b), which discusses greater restrictions on purpose infinitives in English than on the other kind of goal infinitives (i.e., 'rationale infinitives'), but still argues for the adjunct status of both kinds of goal infinitives.

in (8.10) and the benefactive in (8.11) are adjuncts. However, this is not so according to our putative test:

(8.10) Janek spalił mamie dom, a Marysia zrobiła to ojcu.
John burnt mother$_{dat}$ house and Mary did it father$_{dat}$
'John burnt his mother's house, and Mary did so to his father.'

(8.11) *Janek poszedł mamie po papierosy, a Marysia zrobiła to ojcu.
John went mother$_{dat}$ for cigarettes and Mary did it father$_{dat}$
'John went to buy his mother cigarettes, and Mary did so to her father.' (intended)

We are not aware of any theory which would want to treat the dative NPs in the two examples above differently with respect to their complement/adjunct status.

***Zrobić To* May Refer to a Verb Alone** There is an even more serious objection to the putative *zrobić to* test, namely, *zrobić to* may take the meaning of the verb alone, i.e., without the verb's arguments (compare §7.3.1 above). This is illustrated with the following attested[5] example.

(8.12) Chłopi, jeśli już muszą wysypywać zboże, niech to robią ze swoim, nie
farmers if really must$_{3rd,pl}$ dump$_{inf}$ grain let it do$_{3rd,pl}$ with Self$_{poss}$ NM
sięgając do cudzej własności.
reaching for somebody else's property
'If the farmers really must dump grain, they ought to do that with their own (grain), not reaching for somebody else's property.'

Such examples are difficult to construct because, when the object of the preposition *z/ze* 'with' is human (or animate), the relevant reading is blocked by the popular idiomatic (euphemistic) expression *zrobić to (z kimś)* 'have sexual intercourse (with somebody)' (lit: 'do it (with somebody)'), cf. Dąbrowska (1998, p.102). However, in such cases, adding *samo* 'same' to *zrobić to* restores the anaphoric meaning, as in the following example from Piernikarski (1986, p.235).

(8.13) Wczoraj pobił Wojtka, a dziś to samo zrobił z Mietkiem.
yesterday beat$_{3rd,sg,masc}$ Wojtek and today it same did$_{3rd,sg,masc}$ with Mietek
'Yesterday, he beat Wojtek, and today, he did the same to Mietek.'

8.1.3 *Zrobić To* is a Pragmatic Anaphor

We showed in the previous subsection that the results of the *zrobić to* test do not conform to the linguistic intuitions about the complement–adjunct dichotomy and that *zrobić to* may refer to the meaning introduced by the verb alone. In this subsection we argue that this test cannot tell us anything about the syntax of complements and adjuncts because, just as *do*

[5] The *Rzeczpospolita* daily, 4th August 1998.

so, *zrobić to* is a clear case of pragmatic anaphora, i.e., it refers to conceptual objects, rather than syntactic entities.

First of all, *zrobić to* is a pragmatic anaphor according to the tests discussed in Hankamer and Sag (1976) and Sag and Hankamer (1984). Most conspicuously, it patterns with *do it*, but not with VP Ellipsis, in being able to be controlled by the context; compare Hankamer and Sag's (1976) (7.4)–(7.5), repeated below, with the Polish (8.14).

(7.4) [Hankamer attempts to stuff a 9-inch ball through a 6-inch hoop]
Sag: # It's not clear that you'll be able to.

(7.5) [Same context]
Sag: It's not clear that you'll be able to do it.

(8.14) [Context as in (7.4)]

Nie sądzę, żeby ci się udało to zrobić.
NM think Comp you$_{dat}$ RM manage it do

'I don't think you can do that.'

Second, *zrobić to* again patterns with pragmatic anaphors in being able to be controlled by syntactically non-parallel antecedents, in particular, by passive antecedents. Compare (7.6)–(7.7) from Hankamer and Sag (1976), reapeated below, with the Polish (8.15):

(7.6) Nobody else would take the oats down the bin,

a. so Bill did.
b. so Bill did it.

(7.7) The oats had to be taken down to the bin,

a. *so Bill did.
b. so Bill did it.

(8.15) Owies musiał być zaniesiony do piwnicy i, jak zwykle, zrobił to Bill.
oats had to be$_{inf}$ carried to cellar and as usual did it Bill

'The oats had to be taken down to the cellar and, as usual, Bill did it.'

Finally, *zrobić to* can assume a meaning *generalized* from that introduced by some textual element. For example, (8.16), i.e., the Polish translation of (parts of) (7.143), repeated below from §7.3.3.3, is as good as its English analogue.

(7.143) Kohl, Europe's longest-serving statesman, won the last general election in 1994 after trailing badly in the polls beforehand. Despite widespread disenchantment with his rule and unemployment nudging a post-war record of 5m, he could yet *do so* again. (The Sunday Times)
do so = win a general election (after trailing badly in the polls beforehand)

(8.16) Kohl zwyciężył w ostatnich wyborach w roku 1994, choć wcześniej długo pozostawał w tyle w sondażach opinii publicznej. Mimo ogólnego rozczarowania jego rządami i rekordowego bezrobocia, nie jest wykluczone, że *zrobi to* jeszcze raz.

zrobi to = *zwycięży w wyborach* 'win a general election'

Thus, in summary, *zrobić to* is a clear case of a pragmatic anaphor and, as such, can provide some insight into the nature of conceptual objects that can be referred to by such anaphors, but not into the (putative) syntactic nature of the complement–adjunct distinction.[6]

8.2 Extraction

8.2.1 Adjuncts vs. Complements?

As we saw in §6.3, the last decade has witnessed a re-evaluation of the opinion dominant in the eighties (at least since Huang (1982)) that the apparent extractability differences between complements and adjuncts are best explained by their different structural positions and θ-role-receiving properties: complements are sisters to verbs, they are θ-marked by the verb and, hence, their traces can satisfy the Empty Category Principle via the lexical/θ-government clause; on the other hand, adjuncts are not lexical/θ-governed, so they have to be antecedent-governed, which forces cyclicity of movement. This allegedly explains, e.g., the following contrast in extraction from *wh*-islands:

(8.17) a. ?[Which problem]$_i$ do you wonder how$_j$ to solve t$_i$ t$_j$?

b. *How$_j$ do you wonder [which problem]$_i$ to solve t$_i$ t$_j$?

It soon became clear that the parallelism between the selected argument (complement) vs. non-selected argument (adjunct) dichotomy on the one hand and the extractability results on the other is far from perfect. Rizzi (1990, p.77) discusses cases of lexically selected (θ-marked) adverbials, measure phrases and idiom chunks, which, contrary to predictions, pattern with prototypical adjuncts. The grammaticality judgements in (8.18) (from Rizzi (1990, p.4)) are roughly parallel to those in (8.17) above: the complement of *behave* in (8.18) has the same extraction properties as the manner adverbial in (8.17), an uncontroversial adjunct.

(8.18) a. ??[With whom]$_i$ do you wonder how$_j$ to behave t$_i$ t$_j$?

b. *How$_j$ do you wonder [with whom]$_i$ to behave t$_i$ t$_j$?

On the basis of such facts, Rizzi (1990, p.85) concludes that "referential elements are (marginally) extractable from islands, nonreferential elements are not." Cinque (1990, p.8) argues further that "of all the phrases that receive a referential θ-role, in Rizzi's sense, only

[6]Just as *so* seems to be responsible for the anaphoric properties of *do so*, it is probably *to* that is responsible for the anaphoric properties of *zrobić to*. This opens the question whether *to* in *zrobić to* can be assimilated to other anaphoric uses of *to* (see, e.g., Progovac (1998) for a discussion of various uses of the 'event pronominal' *to* in Serbo-Croatian).

those can be long *Wh*-Moved that are used strictly referentially," i.e., that are "members of a pre-established set," in a sense similar to Pesetsky's (1987) D-linking.

Although Rizzi (1990) and Cinque (1990) show that extraction possibilities cannot be explained by the complement/adjunct dichotomy alone, they still assume the relevance of this distinction: only complements can receive θ-roles, hence only a subclass of complements can receive *referential* θ-roles, and only they are subject to long *Wh*-movement; other complements and all adjuncts are assumed to pattern alike with respect to extraction. We saw in §6.3.3 that this position led Rizzi (1990) to classifying free instrumental, locative and temporal elements, which extract like corresponding complements, as selected.

It is clear now that the variation in extractability "lies not in the distinction between arguments and adjuncts but in the (internal) nature of extracted elements" (Hukari and Levine, 1994, p.284). Not only can complements be split according to extractability over weak islands (referentially θ-marked vs. non-referentially θ-marked complements in Rizzi (1990)), but also adjuncts do not pattern alike: although they, unlike complements, have long been assumed to be unable to extract over factive or inner islands (Cinque, 1990), this is not always true. Pollard and Sag (1994, pp.180–181) give the following examples (*inter alia*):

(8.19) a. When their parents are in town next week, I doubt that the twins will attend any lectures.

b. During my term as University President, I deny there were any illegitimate appropriations of government money.

Summing up the discussion in the literature so far (cf., especially, Hukari and Levine (1995)), it becomes clear that the functional distinction between complements and adjuncts and the classification on the basis of extractability properties are two orthogonal partitions of dependents: there are (functional) complements which extract like prototypical adjuncts (cf. e.g. (8.18)) and there are (functional) adjuncts which pattern more with prototypical complements than with prototypical adjuncts (cf. e.g. (8.19)). In the next subsection we will see that this is also true about Polish.

8.2.2 Extraction *of* Complements and Adjuncts

Although much has been written on *wh*-extraction in Polish (cf. e.g. Kardela (1986b), Bobrowski (1988, ch.3–4), Willim (1989, ch.4), Witkoś (1993)), the task of describing possible differences between various kinds of dependents in this respect is still to be undertaken. This issue is, however, briefly considered in Witkoś (1992, 1993). Witkoś (1992) argues that "[t]he only Island Constraint that affects non-arguments but is insensitive to arguments is Inner (Negative) Island." He supports his claim with the following facts (his (89)–(90)):[7]

(8.20) a. Nie rozmawiałem z Brianem poufnie.
NM spoke$_{1st,sg}$ with Brian confidentially

[7]Grammaticality judgements are Witkoś's. To our ears the unacceptability of (8.20c) and (8.21b) does not deserve a '*' and it may actually be the result of a pragmatic deviation: these sentences seem to make sense only as echo questions.

'I didn't speak with Brian confidentially.'

b. Z kim nie rozmawiałeś poufnie?
with whom NM spoke$_{2nd,sg}$ confidentially
'With whom didn't you speak confidentially?'

c. *Jak nie rozmawiałeś z Brianem?
how NM spoke$_{2nd,sg}$ with Brian
'How didn't you speak with Brian?'

(8.21) a. Ziemniaki nie ważyły dwa kilo.
potatoes NM weigh two kilos
'The potatoes didn't weigh two kilos.'

b. *Ile nie ważyły ziemniaki?
how much NM weigh potatoes
'How much didn't the potatoes weigh?'

Note, however, that (8.21) actually provides a counter-example to Witkoś's claim: *dwa kilo* is an obligatory dependent and, hence, by the commonly accepted functional and syntactic-functional criteria, it is a complement.[8] And yet, the relative unacceptability of (8.21b) is similar to that of (8.20c).

Independence of extraction possibilities from the (functional) adjunct-complement dichotomy is further confirmed by the following sentences, which should be contrasted with (8.20):

(8.22) a. Nie zachowywałem się nieprzyzwoicie z Brianem.
NM behaved$_{1st,sg}$ RM indecently with Brian
'I didn't behave indecently with Brian.'

b. Z kim nie zachowywałeś się nieprzyzwoicie?
with whom NM behaved$_{2nd,sg}$ RM indecently
'With whom didn't you behave indecently?'

c. *Jak nie zachowywałeś się z Brianem?
how NM behaved$_{2nd,sg}$ RM with Brian
'How didn't you behave with Brian?'

To our ears, (8.22b), in which the fronted element is probably an adjunct, is as acceptable as the complement-fronting (8.20b). On the other hand, (8.22c), a case of complement fronting, is as unacceptable as (8.20c). These considerations show that extractability over negative island is an issue orthogonal to the functional distinction. What seems to matter instead is the inherent status of the extracted element, perhaps its referentiality, as argued by Rizzi (1990) and Cinque (1990).[9]

In his later work, Witkoś (1993) mentions another candidate for weak island in Polish, i.e., for an island type distinguishing complements from adjuncts: the *Wh* Island. This claim is based on examples like (8.23) ((5.38) in Witkoś (1993, p.184), grammaticality judgements his).

[8] It is unambiguously a complement also within the host framework of Witkoś's analysis, i.e., Rizzi (1990) and Cinque (1990). Actually, selected measure adverbials, apart from selected manner adverbials and idiom chunks, provided main argument for Rizzi's use of referential indices (cf. Rizzi (1990, §§3.2 and 3.5)).

[9] See also Kuno and Takami (1997) for arguments against linking exctractability over negative islands either to the complement/adjunct dichotomy or to referentiality.

(8.23) a. Co$_i$ Iwona chce, żeby jak$_i$ Tomek zjadł t$_i$ t$_j$?
what Ivonne want$_{3rd,sg}$ Comp how Tom eat
'What does Ivonne want Tom to eat how?'

b. *Jak$_j$ Iwona chce, żeby co$_i$ Tomek zjadł t$_i$ t$_j$?
how Ivonne want$_{3rd,sg}$ Comp what Tom eat

Note, however, that whatever the grammaticality status of (8.23) (to our ears, both examples sound rather bad without a proper context, see below), it seems to be parallel to the following examples, and thus orthogonal to the complement/adjunct dichotomy:[10]

(8.24) a. [Z kim]$_j$ Iwona chce, żeby jak$_i$ Tomek się zachowywał t$_i$ t$_j$?
with whom Ivonne want$_{3rd,sg}$ Comp how Tom RM behave
'With whom does Ivonne want Tom to behave how?'

b. *Jak$_i$ Iwona chce, żeby [z kim]$_j$ Tomek się zachowywał t$_i$ t$_j$?
how Ivonne want$_{3rd,sg}$ Comp with whom Tom RM behave

Moreover, it seems that the acceptability status of the pattern (8.23b) improves drastically under the right discourse-linking conditions (cf. Pesetsky (1987) and Dornisch (1995)[11]). The question below becomes completely acceptable if the knowledge of who the possible examinees are is shared by the speaker and the hearer (thus, *kogo* is D-linked), but the speaker does not know Jacek's wishes as to the method of examination (*jak* is not D-linked).

(8.25) Jak$_j$ Jacek chce, żeby kogo$_i$ Iwona przeegzaminowała t$_i$ t$_j$?
how Jack want$_{3rd,sg}$ Comp who Ivonne examine
'How does Jack want Ivonne to examine whom?'

On the basis of the above considerations we conclude that there is no evidence for the relevance of the functional complement/adjunct distinction for extraction in Polish. On the contrary, it seems that the partition of dependents via the functional criterion is fully orthogonal to the partition according to their extractability status.

8.2.3 Extraction *from* Complements and Adjuncts

As we show below, also extraction *from* various dependents fails to distinguish between complements and adjuncts. We first consider extraction from subordinate clauses, and then from NPs and PPs.

[10] Again, the grammaticality judgements in (8.24) should not be understood as absolute, they rather show the parallelism with (8.23).

[11] Although we are sympathetic with the spirit of the analysis of Dornisch (1995), we cannot agree with many of the details. In particular, we consider her argument for maintaining a configurational distinction between arguments and non-arguments (pp.80–84) flawed as it is based on extraction differences between subjects and adjuncts, and cannot be easily carried over to the case of complements and adjuncts.

8.2.3.1 Extraction from Subordinate Clauses

Although it is a well known fact that extraction from Polish subordinate clauses with a complementizer is fairly restricted (e.g., Kardela (1986b), Willim (1989, ch.4), Witkoś (1993)), there is some controversy as to what exactly can be moved out of what kind of clauses. For example, most authors deny the possibility of extracting anything out of indicative *że*-clauses (Lasnik and Saito, 1984; Kardela, 1986b; Willim, 1989; Witkoś, 1993), others postulate the existence of bridge verbs allowing for extraction of complements but not subjects (Cichocki, 1983; Zabrocki, 1989), while some claim that under proper circumstances also subjects can be extracted (Bobrowski, 1988, ch.3). Similar confusion concerns the so-called subjunctive *żeby*-clauses, but it is clear that they can at least in some positions allow extraction of at least complements and adjuncts. Since *żeby*-clauses, unlike *że*-clauses, uncontroversially allow extraction and at the same time can act either as complements or as adjuncts, they can provide a testbed for the issue at hand.

Consider the examples below:

(8.26) *Komu$_i$ zrobiłem to, żeby pomóc t$_i$?
who$_{dat}$ did$_{1st,sg}$ this Comp help$_{inf}$
'I did it in order to help whom?' (intended)

(8.27) *Komu$_i$ kazałem mu, żeby pomógł t$_i$?
who$_{dat}$ ordered$_{1st,sg}$ him$_{dat}$ Comp help$_{3rd,sg}$
'Whom did I order him to help?' (intended)

(8.28) *Komu$_i$ prosiłem go, żeby pomógł t$_i$?
who$_{dat}$ asked$_{1st,sg}$ him$_{acc}$ Comp help$_{3rd,sg}$
'Whom did I ask him to help?' (intended)

(8.29) ?Komu$_i$ chciałem, żeby pomógł t$_i$?
who$_{dat}$ wanted$_{1st,sg}$ Comp help$_{3rd,sg}$
'Whom did I want him to help?'

(8.30) ?Komu$_i$ chciałem, żeby pomóc t$_i$?
who$_{dat}$ wanted$_{1st,sg}$ Comp help$_{inf}$
'Whom did I want one/us to help?'

(8.31) Komu$_i$ chciałem pomóc t$_i$?
who$_{dat}$ wanted$_{1st,sg}$ help$_{inf}$
'Whom did I want to help?'

(8.26) is an example of extraction out of goal adjunct, (8.27)–(8.30) — out of various subcategorized *żeby*-clauses, and (8.31) shows extraction out of a complementizerless infinitival clause. Only the last one is unconditionally acceptable to all speakers, while the judgements about (8.29)–(8.30) vary from acceptable through acceptable as echo questions to unacceptable (to our ears they are acceptable, although not perfect). On the other hand, all of (8.26)–(8.28) were judged unacceptable by our informants. Since (8.26) involves a *żeby*-adjunct, while

(8.27)–(8.28) involve *żeby*-complements, this means that the possibility of extraction from *żeby*-clauses does not reflect the complement/adjunct distinction.

The defender of the relevance of the dichotomy at hand for extraction may reply to the above by saying that extraction distinguishes between complements and adjuncts *in principle*, i.e., that it is in principle ungrammatical across adjuncts and in principle grammatical across complements, but there are additional linguistic constraints which make extraction across complements (8.27)–(8.28) unacceptable. However, as (8.32)–(8.33) show, this would be wrong: there are clausal dependents which are clear (functional) adjuncts, but which nevertheless allow extraction:[12]

(8.32)	Co_i	poszedłeś	kupić	t_i?
	what_{acc}	$\text{went}_{2nd,sg}$	buy_{inf}	

‘You went to buy what?’

(8.33)	?Co_i	chciałeś,	żebym	poszedł	kupić	t_i?
	what_{acc}	$\text{wanted}_{2nd,sg}$	$\text{Comp}_{1st,sg}$	go	buy_{inf}	

‘What did you want me to (go and) buy?’

Note that, according to the popular functional criterion, the *kupić*-dependent must be classified as an adjunct: it is neither syntactically obligatory, nor is it indispensable to complete the meaning of the verb. This confirms our conclusion that the complement/adjunct dichotomy is orthogonal to extraction facts.

This conclusion calls for re-examining the reasons for the contrast between (8.26)–(8.28) on one hand, and (8.29)–(8.30) on the other. Willim (1989) and Witkoś (1993) associate such differences with the possibility of substituting the *żeby*-clause with an infinitival clause: this is possible in case of (8.29)–(8.30) (as (8.31) shows), but not in case of (8.26) or (8.28); compare (8.28) above to (8.34) below.

(8.34)	*Prosiłem	go	pomóc	Ewie.
	$\text{asked}_{1st,sg}$	him_{acc}	help_{inf}	Eve

However, although *kazać* ‘order’ can occur with an infinitival clause or VP (cf. (8.35)), (8.27) above is still unacceptable.[13]

(8.35)	Kazałem	mu	pomóc	Ewie.
	$\text{ordered}_{1st,sg}$	him_{acc}	help_{inf}	Eve

‘I ordered him to help Eve.’

Moreover, there are verbs which (marginally) allow extraction out of their *żeby*-complements, but which cannot occur with an infinitival clause, e.g., *domagać się* ‘require’:

[12] This argument rests on the assumption that there is no argument composition (Hinrichs and Nakazawa, 1990, 1994a) involved in (8.32)–(8.33).

[13] Witkoś (1993) notes that extraction across *kazać* gives worse results than extraction across *chcieć*, but according to his judgements the difference is very small.

(8.36) a. ?Komu$_i$ domagam się, żeby pomóc t$_i$?
who$_{dat}$ require$_{1st,sg}$ RM Comp help$_{inf}$
'Whom do I want one/us to help?'

b. *Domagam się pomóc Ewie.
require$_{1st,sg}$ RM help$_{inf}$ Eve$_{dat}$

In fact, if there is a correlation between the possibility of extraction out of a *żeby*-dependent of a verb and this verb's alternative valency frames, it is a correlation with the possibility of substituting the *żeby*-clause with an NP: such a substitution is possible in all of (8.29)–(8.31) and (8.36a), but none of (8.26)–(8.28). Nevertheless, extraction out of subordinate clauses in Polish still awaits a successful analysis.

8.2.3.2 Extraction from NPs and PPs

Finally, let us consider extraction out of NPs and PPs. Polish, like other Slavic languages, does not satisfy the Left Branch Condition of Ross (1967) and allows left-branch extraction from the NP complement of the kind below:

(8.37) Który skończyła artykuł?
which finished$_{3rd,sg,fem}$ article
'Which article did she finish?'

(8.38) ?Który chciałeś, żeby skończyła artykuł?
which wanted$_{2nd,sg}$ Comp finish$_{3rd,sg,fem}$ article
'Which article did you want her to finish?'

If adjuncts did not allow extraction, left-branch extraction out of adjunct NPs should be unacceptable. This, however, is contradicted by facts such as (8.39)–(8.40) below, showing similar grammaticality patterns as (8.37)–(8.38) above.

(8.39) Którym przyjechała pociągiem?
which$_{ins}$ came$_{3rd,sg,fem}$ train$_{ins}$
'On which train did she come?'

(8.40) ?Którym chciałeś, żeby przyjechała pociągiem?
which$_{ins}$ wanted$_{2nd,sg,masc}$ Comp come$_{3rd,sg,fem}$ train$_{ins}$
'On which train did you want her to come?'

Similarly, extraction out of PPs does not distinguish between complements and adjuncts; (8.41)–(8.42) involving extraction out of complement PPs should be compared with (8.43)–(8.44), which are examples of extraction out of adjunct PPs.

(8.41) W czyim zamieszkam pokoju?
in which live$_{1st,sg,fut}$ room
'In which room will I live?' ('Into which room should I move in?')

(8.42) ?W czyim chciałeś, żebym zamieszkał pokoju?
in which wanted$_{2nd,sg}$ Comp live$_{1st,sg}$ room
'In which room will you want me to live?'

(8.43) W czyim zatańczę pokoju?
in which dance$_{1st,sg,fut}$ room
'In which room will I dance?'

(8.44) ?W czyim chciałeś, żebym zatańczył pokoju?
in which wanted$_{2nd,sg}$ Comp dance$_{1st,sg}$ room
'In which room will you want me to dance?'

In conclusion, neither extraction from subordinate clauses, nor extraction out of NPs and PPs distinguish between complements and adjuncts in Polish.

8.2.4 Multiple Wh-Fronting

Before we move to parasitic gaps, a note on another apparent reflex of the putative configurational complement/adjunct dichotomy, discussed in Przepiórkowski (1994), is in order. It is claimed there that adjunct *wh*-phrases fronted in multiple *wh*-questions must be coordinated, cf. (8.45), while multiple *wh*-fronted complements (plus, perhaps, one adjunct) do not have to be, cf. (8.46).

(8.45) a. *Gdzie kiedy Janek kichnął?
where when John sneezed

b. Gdzie i kiedy Janek kichnął?
where and when John sneezed
'Where and when did John sneeze?'

(8.46) a. Kto co komu dał?
who what whom gave?
'Who gave what to whom?'

b. Kto co kiedy od kogo pożyczył?
who what when from whom borrowed
'Who borrowed what from whom and when?'

This contrast is explained via the Chomsky (1986b) version of the Empty Category Principle, i.e., assuming the configurational (and θ-role assignment) difference between complements and adjuncts.

However, it turns out that the contrast is not as clear as this ECP analysis would predict. For example, both sentences below, involving two *wh*-fronted adjuncts, are acceptable.

(8.47) a. Gdzie i o jakiej porze robisz zakupy?
where and at what time do$_{2nd,sg}$ shopping

‘Where and at what time do you do shopping?’

b. Gdzie o jakiej porze robisz zakupy?
where at what time do$_{2nd,sg}$ shopping
‘Where do you do shopping at what time?’

As the English translations indicate, there is a certain difference in meaning, though: while (8.47a) is most naturally understood as soliciting a simple answer, e.g., *Zwykle rano, w Carrefourze* ‘Normally in the morning, in Carrefour’, (8.47b) seems to solicit a pair-list answer, e.g., *Rano w Carrefourze, po południu w Hicie, a wieczorem w Megasamie* ‘In Carrefour in the morning, in Hit in the afternoon, and in Megasam in the evening’.

This tendency might explain the unacceptability of examples such as (8.45a): they are odd pragmatically. For example, in the particular case of (8.45), it is much more bizarre to ask about the space and time coordinates of all (or usual) sneezing events involving John, then it is to ask about the coordinates of just one such contextually salient event.

This tentative explanation is confirmed by the acceptability of further examples involving multiple adjunct *wh*-fronting; in all of (8.48)–(8.50), the pair-list reading is pragmatically sanctioned.[14]

(8.48) W którym kraju o której godzinie zaczynają się przedstawienia teatralne?
in which country at which hour start RM performances theatre
‘At what time do theatre performances start in which country?’
(Possible answer: ‘At 7pm in Poland and Germany, at 8pm in Great Britain...’)

(8.49) ?Kiedy jakim sposobem uciekłeś z więzienia?
when what$_{ins}$ manner$_{ins}$ escaped$_{2nd,sg,masc}$ from prison
‘When did you escape from prison in what manner?’

(8.50) ?Gdzie kiedy występują Kayah i Bregović?
where when perform Kayah and Bregović
‘Where do Kayah and Bregović perform when?’

On the other hand, having at most one *wh*-fronted adjunct does not guarantee that coordination may be avoided. For example, (8.51a), from Bobrowski (1988, p.102), is unacceptable, although it involves only one adjunct, just as the acceptable (8.46b) does; (8.51b), however, is fine.

(8.51) a. ?*Co dlaczego Janek pożyczył?
what why John borrowed/lent

b. Co i dlaczego Janek pożyczył?
what and why John borrowed/lent
‘What did John borrow/lend why?’

[14] (8.49) is constructed on the basis of (i) below from Wachowicz (1974, p.160):

(i) Kto jakim sposobem uciekł z więzienia?
who$_{nom}$ what$_{ins}$ manner$_{ins}$ escaped from prison
‘Who escaped from prison in what manner?’

Thus, in summary, contrary to the claim in Przepiórkowski (1994), there is no strict correlation between the complement/adjunct dichotomy, on the one hand, and the necessity of *wh*-fronted phrases to be coordinated, on the other hand. This, however, re-opens the question, what exactly forces fronted *wh*-phrases to be coordinated in some cases, but not in others. Trying to answer this question here would lead us too far afield.

8.3 Parasitic Gaps

A phenomenon related to extraction and similarly claimed to distinguish between complements and adjuncts is parasitic gapping.[15] For example, Bondaruk (1996, pp.113f.) gives the contrast in (8.52)–(8.53) and tentatively explains it within the setup of Chomsky (1986b) in terms of the ECP: the parasitic (second) gap in (8.52) corresponds to a complement, i.e., it is lexically/theta-governed, while the parasitic gap in (8.53) is an adjunct gap, which is neither lexically/theta-governed, nor antecedent-governed, and, hence, violates the ECP.

(8.52) Jaki owoc$_i$ musiałeś obrać $\_\_{}_i$, zanim ugotowałeś $\_\_{}_i$?
what fruit had$_{2nd,sg,masc}$ peel$_{inf}$ before cooked$_{2nd,sg,masc}$
'What fruit did you have to peel before cooking?'

(8.53) *Jak głośno$_i$ Janek śpiewał $\_\_{}_i$, zanim zagrał $\_\_{}_i$?
how loudly John sang$_{3rd,sg,masc}$ before played$_{3rd,sg,masc}$
'How loudly did John sing before playing (so loudly)?' (intended)

However, having criticized Chomsky's (1986b) approach to parasitic gaps and moving on to Cinque's (1990) analysis, Bondaruk (1996, p.122, fn.3) provides examples which show that adverb phrases cannot participate in parasitic gap constructions even when both gaps occur in argument positions:

(8.54) *Jak$_i$ trzeba postępować $\_\_{}_i$, żeby być traktowanym $\_\_{}_i$?
how should behave$_{inf}$ Comp be$_{inf}$ treated
'How should one behave in order to be treated (the same way)?' (intended)

Thus, just as in case of extraction, the deciding factor for the possibility of parasitic gap licensing seems to be the categorial makeup or the referentiality of the filler, and not its complement/adjunct status.

In fact, the independence of parasitic gapping from the complement/adjunct dichotomy seems to be greater than Bondaruk's (1996) final analysis, based on the approach of Cinque (1990), would predict.[16] Consider the two pairs below:

[15] This section is based on Bondaruk (1996) and it assumes, if only for the sake of argument, that the relevant examples are best analysed as instances of parasitic gaps, as opposed to, say, object *pro*-drop.

[16] See also Calcagno *et al.* (1999) and Levine *et al.* (1999) for a comprehensive criticism of Cinque's (1990) approach to parasitic gaps, and also §6.3.3 above for a general critique of Rizzi's (1990) and Cinque's (1990) approach to the complement/adjunct dichotomy.

(8.55) Czym$_i$ przybiłeś gwóźdź, zanim...
what$_{ins}$ hammered$_{2nd,sg,masc}$ nail$_{acc}$ before

'With what did you drove the nail before...'

a. ??...stłukłeś szybę $\_\__i$?
broke$_{2nd,sg,masc}$ glass$_{acc}$

'...you brok glass (with it)?'

b. ??...posłużyłeś się $\_\__i$ przy tłuczeniu szyby?
used$_{2nd,sg,masc}$ RM at breaking glass

'...you used (it) when breaking glass?'

(8.56) Komu$_i$ podarowałeś książkę $\_\__i$, zanim...
whom$_{dat}$ donated$_{2nd,sg,masc}$ book$_{acc}$ before

'Whom did you give a book as a present before...

a. ?...kupiłeś CD $\_\__i$?
bought$_{2nd,sg,masc}$ CD

'...you bought (them) a CD?'

b. ...dałeś CD $\_\__i$?
gave$_{2nd,sg,masc}$ CD

'...you gave (them) CD?'

Examples (8.55a)–(8.56a) involve (functional) adjunct parasitic gaps, while (8.55b)–(8.56b) involve (functional) complement parasitic gaps. Thus, according to the Cinque (1990) / Bondaruk (1996) analysis, the a. examples should be unacceptable, while the b. examples should be acceptable, i.e., the contrasts should be clear.

Although there is some difference in acceptability between (8.55a)–(8.56a) and (8.55b)–(8.56b), it is certainly not the grammatical/ungrammatical contrast and it can readily be explained on independent grounds: if the relevant readings of (8.55a)–(8.56a) are somewhat difficult to get, this is because there are other readings of these sentences immediately available, namely, the readings *without* an adjunct parasitic gap. In view of the fact that parasitic gap constructions, including such innocent cases as (8.52), are often felt as being only marginally acceptable, these other fully acceptable readings simply block the marginal parasitic readings.

On the other hand, there is not such an ambiguity in case of sentences (8.55b)–(8.56b), involving complement parasitic gaps: these sentences are at best elliptical when the complement is missing. This ellipsis must be resolved, and the 'parasitic gap strategy' is a good way of doing so.

Thus, parasitic gaps in Polish are one more phenomenon which, on first blush, seems to correlate with the complement/adjunct dichotomy, but, on closer inspection, turns out to be fully orthogonal to it.

8.4 Binding

To the best of our knowledge, there has been no discussion of the complement/adjunct dichotomy in the context of Polish binding facts.[17] However, in the generative literature on Germanic languages (including English), it is often assumed or concluded that binding facts distinguish between complements and adjuncts. In this section we will deal with two main claims of that sort, namely that adjuncts are in general exempt from binding theory (e.g., Pollard and Sag (1992, 1994) and Reinhart and Reuland (1991, 1993)) and that they are exempt from Condition C in antireconstruction cases (e.g., Lebeaux (1988) and Hukari and Levine (1996)), showing that both of these claims are void in Polish.

Although we do not pretend to provide a complete binding analysis for Polish here (see Willim (1989), Reinders-Machowska (1991) and Marciniak (1999) for some attempts), we conclude this section by pointing out some consequences of Polish binding facts for two highly articulated binding theories: Pollard and Sag (1992, 1994) and Reinhart and Reuland (1991, 1993).

8.4.1 Adjuncts outside the Scope of BT?

According to the binding theory of Pollard and Sag (1994, ch.6), only arguments (subjects and complements) are subject to binding principles; this is the result of defining such notions as *(local) o-command* and *(local) o-binding* in terms of the SUBCAT attribute (later renamed as ARG-S and subsequently as ARG-ST), which contains only the (*synsem*s of) subcategorized dependents. One prediction of this analysis is that bare NP adjunct anaphors are actually *logophors* ('discourse pronouns'), i.e., their co-indexation properties are discourse- and processing-driven (Pollard and Sag, 1994, §6.7). In particular, logophors are assumed to reflect the point of view with which the narrator sympathizes, as in (8.57), from Zribi-Hertz (1989) (after Reinhart and Reuland (1993)):

(8.57) It angered him that she... tried to attract a man like himself.

Reinhart and Reuland (1993) independently reach a very similar conclusion and construct a binding theory in terms of conditions on reflexive predicates, i.e., predicates with two *arguments* co-indexed.[18] Since reflexive adjuncts do not reflexivize a predicate, they are exempt from this theory.

We will show below that Polish binding facts are insensitive to the complement/adjunct dichotomy, contrary to the predictions of Pollard and Sag (1992, 1994) and Reinhart and Reuland (1991, 1993). In what follows, we will examine in turn the behaviour of reflexives,[19] personal pronouns and non-pronominal NPs (R-Expressions).

[17] The only exceptions are remarks made by Willim (1989, ch.3, fn.20) (after Fisiak *et al.* (1978)) and Marciniak (1999) that an anaphor within an adjunct must be bound in the same domain as an anaphor in a complement.

[18] This is a gross oversimplification; see §8.4.3.3 and their article for details. We trust, however, that the point we are making is valid.

[19] We do not discuss reciprocal uses of anaphors. As noted in the literature (Reinders-Machowska, 1991; Kupść and Marciniak, 1997; Marciniak, 1999), both the domain and the possible antecedents of Polish reciprocals are different than those of reflexives.

8.4.1.1 Reflexives

The basic generalizations concerning anaphor-binding in Polish as discussed in the literature (Willim, 1989; Reinders-Machowska, 1991; Marciniak, 1999) are following: 1) Polish does not have long-distance anaphors, 2) the reflexive pronoun *siebie*[20] and the reflexive possessive *swój* are middle-distance anaphors with 3) a tensed clause as a binding domain and 4) c-commanding subjects as the only possible antecedents.[21]

The examples below show that adjunct-contained anaphors are subject to exactly the same requirements.[22]

(8.58) Marek$_i$ chwalił się, że Ewa$_j$ rozwiązała zadanie **swoim$_{*i/j}$ sposobem**.
Mark boasted RM Comp Eve solved problem Self$_{poss,ins}$ method$_{ins}$
'Mark boasted of Mary's solving the problem with his/her own method.'

(8.59) Złościło ją$_i$, że Marek$_j$ wysłał zaproszenie **swoim$_{*i/j}$ samochodem**.
anger$_{3rd,sg}$ she$_{acc}$ Comp Mark sent$_{3rd,sg}$ invitation Self$_{poss,ins}$ car$_{ins}$
'It made her angry that Mark sent the invitation by her/his own car.'

(8.60) Tomek$_i$ podejrzewał, że Maria$_j$ nie ugotowała **sobie$_{*i/j}$** obiadu (bo go chciała ukarać).
Tom suspected$_{3rd,sg}$ Comp Mary NM cooked$_{3rd,sg,fem}$ Self$_{dat}$ dinner (because he$_{acc}$ wanted$_{3rd,sg,fem}$ punish)
'Tom suspected that Mary hadn't cooked himself/herself the dinner (because she wanted to punish him).'

(8.61) Ewa$_i$ poprosiła pielęgniarkę$_j$, żeby poprawiła poduszkę **swojej$_{*i/j}$ mamie**.
Eve asked$_{3rd,sg,fem}$ nurse Comp correct pillow Self$_{poss,dat}$ mother$_{dat}$
'Eve asked the nurse to move her mother's pillow.'

(8.62) Janek$_i$ chciał, żeby Ewa$_j$ biegła **swoim$_{*i/j}$ tempem** (i nie zostawała w tyle).
John wanted$_{3rd,sg,masc}$ Comp Eve run Self$_{poss,ins}$ speed$_{ins}$ (and NM stay behind)
'John wanted Eve to proceed with his/her own speed (and not to stay behind).'

[20] Throughout this section we ignore what is often called 'the weak form' of the reflexive, i.e., *się*, whose main function seems to be lexical reflexivization. Moreover, *się* seems to be a 'pure reflexive' in the sense of Lidz (1997, 1996), while *siebie* allows the 'near reflexive' construal of the kind discussed by Jackendoff (1992, 1997). This distinction opens a whole plethora of issues which we cannot go into.

[21] One wrinkle in 3) is existence of sentences such as (i) below in which the embedded verb is morphologically infinitive. It is not clear in what sense the embedded clause in such examples is tensed.

(i) Jan chciał, żeby obejrzeć swoje zdjęcia.
John wanted Comp watch$_{inf}$ Self$_{poss}$ photos
'John wanted one/us to see the one's/our photos.'

The analysis of Marciniak (1999) correctly accounts for such cases.

[22] For lack of space, we do not extensively justify that each constituent marked with bold font is an adjunct. Note, however, that they are not indispensable for the meaning of the predicate and are optional. These examples are based on the discussion of bare NP adjuncts in Tajsner (1990, §5.2).

Note that the reflexive must be subject-bound in its minimal tense domain regardless of the kind of adjunct it occurs in (instrument (8.58), means (8.59), benefactive (8.60), recipient of action (8.61) and manner (8.62)), whether it is the reflexive pronoun (8.60) or the reflexive possessive, and whether the subordinate clause is a barrier for *wh*-extraction (in (8.62) it is not). Similar results are obtained in case of anaphors within PP adjuncts.

Also the requirement that the antecedent c-command the anaphor must be satisfied:

(8.63) Niska opinia Janka$_i$ o Marii spowodowała, że próbowała ona rozwiązać
low opinion John$_{gen}$ about Mary cause Comp tried she solve
ten problem **swoim**$_{*i}$/**jego**$_i$ **sposobem**.
this problem Self$_{poss,ins}$/his$_{ins}$ method$_{ins}$
'John's low opinion of Mary made her try to solve the problem with her/his own method.'

It seems then that adjuncts are subject to Principle A just as complements are: they have to be bound by a c-commanding subject withing the minimal tense domain. If argument-binding and adjunct-binding were two completely different processes, as predicted by the analyses of Reinhart and Reuland (1991, 1993) and Pollard and Sag (1992, 1994), this would be a very surprising coincidence.

8.4.1.2 Pronouns

The distribution of personal pronouns is generally complementary with that of anaphors in Polish.[23] This is true also about adjunct-contained pronouns. The sentences below should be compared to (8.58)–(8.62).

(8.64) Ewa$_j$ rozwiązała zadanie **jej**$_{*j}$ **sposobem**.
Eve solved problem her$_{ins}$ method$_{ins}$
'Mary solved the problem with her method.'

(8.65) Marek$_j$ wysłał zaproszenie **jego**$_{*j}$ **samochodem**.
Mark sent$_{3rd,sg}$ invitation his$_{ins}$ car$_{ins}$
'Mark sent the invitation by his car.'

(8.66) Maria$_j$ nie ugotowała **jej**$_{*j}$ obiadu.
Mary NM cooked$_{3rd,sg,fem}$ her$_{dat}$ dinner
'Mary hasn't cooked her the dinner.'

(8.67) Pielęgniarka$_j$ poprawiła poduszkę **jej**$_{*j}$ **mamie**.
nurse corrected pillow her$_{dat}$ mother$_{dat}$
'The nurse moved her mother's pillow.'

[23] The exceptions include 1st and 2nd person pronouns in many contexts, especially as possessives:

(i) Lubię$_i$ mojego$_i$/swojego$_i$ brata.
like$_{1st,sg}$ my/Self$_{poss}$ brother
'I like my brother.'

See also discussion in Willim (1989, ch.3).

(8.68) Ewa$_j$ biegła **jej**$_{*j}$ **tempem**.
Eve ran her$_{ins}$ speed$_{ins}$
'Eve proceeded with her speed.'

In none of (8.64)–(8.68) can the adjunct-contained pronoun be bound by the local subject. This parallels the basic behaviour of argument-contained pronouns, i.e., the requirement that they be not coindexed with a c-commanding subject within their minimal domain of tense. Note that they can be coindexed with a non-c-commanding NP contained within the subject (8.69), with a non-subject argument (8.70), or with a higher subject (8.71).

(8.69) Matka Marii$_i$ nie ugotowała **jej**$_i$ obiadu.
mother Mary$_{gen}$ NM cooked her$_{dat}$ dinner
'Mary's mother didn't cook the dinner for her.'

(8.70) Marek wysłał Tomka$_i$ **jego**$_i$ **(własnym) samochodem**.
Mark sent Tom$_{acc}$ his$_{ins}$ own$_{ins}$ car$_{ins}$
'Mark sent Tom in his own car.'

(8.71) Marek$_i$ chwalił się, że Ewa$_j$ rozwiązała zadanie **jego**$_i$ **sposobem**.
Mark boasted RM Comp Eve solved problem his$_{ins}$ method$_{ins}$
'Mark boasted of Mary's solving the problem with his method.'

Again, this is expected if adjunct-contained pronouns have to satisfy the binding constraints that regulate the behaviour of argument-contained pronouns, but rather surprising if adjuncts are exempt from binding theory.

8.4.1.3 R-Expressions

According to the binding theory of Pollard and Sag (1994), arguments of a predicate do not o-command adjuncts to this predicate. This means that there is no Condition C violation in sentences such as (8.72) below.

(8.72) Nie ugotowała ona$_i$ wczoraj Marii$_{*i}$ obiadu.
not cooked she$_{nom}$ yesterday Mary$_{dat}$ dinner
'She didn't cook dinner for Mary yesterday.'

However, the coindexation between the subject *ona* and the benefactive adjunct *Marii* is unacceptable. This can be partly due to the fact that cataphora in Polish is rather restricted,[24] but this cannot be the whole story. The example below, in which the pronoun does not c-command the adjunct, is drastically improved:

(8.73) Nie ugotowała jego$_i$ matka wczoraj Tomkowi$_{?i}$ obiadu.
not cooked his mother$_{nom}$ yesterday Tom$_{dat}$ dinner
'His mother didn't cook dinner for Tom yesterday.'

[24] It is, however, possible; cf. Willim (1995, fn.7) for some examples.

Moreover, if the unacceptability of (8.72) were due to the linear ordering of the name and the pronoun, we would expect a clear acceptability improvement in analogous sentences with *Marii* moved to the beginning of the clause, e.g., as a result of topicalization or contrastive focus. This prediction is, however, not borne out:

(8.74)

Marii$_{*i}$	nie	ugotowała	ona$_i$	wczoraj	obiadu.
Mary$_{dat}$	not	cooked	she$_{nom}$	yesterday	dinner

'As for Mary, she didn't cook dinner for her yesterday.'

(8.75)

To	MARII$_{*i}$	nie	ugotowała	ona$_i$	wczoraj	obiadu.
FOCUS	Marii$_{dat}$	not	cooked	she$_{nom}$	yesterday	dinner

'It is for Mary, that she didn't cook dinner yesterday.'

On the other hand, the acceptability of (8.73) does improve when *Tomkowi* is moved to the beginning of the clause. Thus, sentences (8.76)–(8.77) are completely grammatical to our ears.

(8.76)

Tomkowi$_i$	nie	ugotowała	jego$_i$	matka	wczoraj	obiadu.
Tom$_{dat}$	not	cooked	his	mother$_{nom}$	yesterday	dinner

'As for Tom, his mother didn't cook dinner for him yesterday.'

(8.77)

To	TOMKOWI$_i$	nie	ugotowała	wczoraj	jego$_i$	matka	obiadu.
FOCUS	Tom$_{dat}$	not	cooked	yesterday	his	mother$_{nom}$	dinner

'It is for Tom, that his mother didn't cook dinner yesterday.'

The same grammaticality contrasts can be observed with other kinds of adjuncts. They are fully expected if adjuncts must satisfy Condition C (or its pragmatic counterpart) just as arguments do, but remains unexplained if they need not. The next section shows that Condition C extends to adjuncts in Polish also in more subtle cases.

8.4.2 Condition C Effects

Hukari and Levine (1996) argue on the basis of examples such as (8.78)–(8.79) that names contained in adjuncts show Condition C effects, albeit different than those contained in complements: they cannot be co-indexed with a c-commanding (*valence c-commanding*, in the terminology of Hukari and Levine (1996)) subject, although they can be co-indexed with complements of the higher clause.

(8.78) a. *They$_i$ went into the city without the twins$_i$ being noticed.

b. You can't say anything to them$_i$ without the twins$_i$ being offended.

(8.79) a. *She$_i$ always gets angry when Kim$_i$ is criticized.

b. We always console her$_i$ when Kim$_i$ is criticized.

This apparently contrasts with names contained in a complement: they cannot be co-indexed either with a higher complement, or with a higher subject:

(8.80) She$_i$ asked her maid$_j$ when Mary$_{*i/*j}$ could finally leave.

Note that the real difference lies in the possibility of co-indexation with a higher complement: it is possible if the name is embedded in an adjunct (cf. (8.78a) and (8.79a)), but not if it is in a complement (8.80).

Polish does not show similar contrasts between complement and adjunct clauses:

(8.81) a. *?Pytałem ją$_i$, kiedy Ewa$_i$ wreszcie posprząta mieszkanie.
asked$_{1st,sg}$ she$_{acc}$ when Eve finally clean flat
'I asked her when will Eve finally clean the flat.'

b. *?Widziałem ją$_i$, kiedy Ewa$_i$ sprzątała mieszkanie.
saw$_{1st,sg}$ she$_{nom}$ when Eve cleaned$_{3rd,sg,fem}$ flat
'I saw her when Eve was cleaning the flat.'

Although in (8.81a) *Ewa* is contained in a complement clause, while in (8.81b) — in a temporal adjunct clause, the acceptability judgements are similar.[25] Another example of this lack of clear contrast is given below:

(8.82) a. *?Zawsze ją$_i$ prosimy, żeby Ewa$_i$ się nie rozpłakała.
always she$_{acc}$ ask$_{1st,pl}$ Comp Eve RM NM cry
'We always ask her not to cry.'

b. *?Zawsze ją$_i$ pocieszamy, żeby Ewa$_i$ się nie rozpłakała.
always she$_{nom}$ comfort Comp Eve RM NM cry
'We always comfort her so that Eve doesn't cry.'

Similarly, antireconstruction effects of the kind discussed in Lebeaux (1988) (cf. also Hukari and Levine (1996) and references therein) do not seem to have a correlate in Polish. Consider the examples (8.83) based on Lebeaux (1988, (54)). Unlike their English counterparts, they do not show any clear difference in acceptability.

(8.83) a. ??W domu Tomka$_i$ mieszka on$_i$ razem z rodziną.
in house Tom$_{gen}$ live$_{3rd,sg}$ he$_{nom}$ together with family
'In Tom's house, he lives together with his family.'

b. ??W domu Tomka$_i$ słucha on$_i$ muzyki razem z rodziną.
in house Tom$_{gen}$ listen$_{3rd,sg}$ he$_{nom}$ music together with family
'In Tom's house, he is listening to music together with his family.'

However, one reason for this symmetry might be that these examples perhaps do not involve extraction at all, but rather scrambling (Polish is a relatively free word order language). More telling are examples (8.84) below.

[25] For most speakers both are unacceptable, although some speakers prefer examples like (8.81a), while others prefer (8.81b). To our ears, (8.81b) (and (8.82b)) is slightly less unacceptable than (8.81a) (and (8.82a)).

(8.84) a. ?W którym domu Janka chciałeś, żeby mieszkał on przez
in which house John$_{gen}$ wanted$_{2nd,sg}$ Comp live he$_{nom}$ through
najbliższy rok?
closest year
'In which house of John's did you want him to live for the next year?'

b. ?W którym domu Janka chciałeś, żeby dbał on szczególnie o
in which house John$_{gen}$ wanted$_{2nd,sg}$ Comp take care he$_{nom}$ especially about
porządek?
order
'In which house of John's did you want him to take special care of cleanness?'

These sentences, however, also do not show clear grammaticality differences. We conclude, thus, that, perhaps unlike in English, binding facts do not distinguish between complements and adjuncts in Polish.

8.4.3 Some Consequences

The conclusion of the previous subsection is that Polish binding facts do not distinguish between complements and adjuncts. In this subsection we examine what consequences this has for two theories of binding which predict such a difference: the HPSG binding theory of Pollard and Sag (1992, 1994) and the Reflexivity framework of Reinhart and Reuland (1991, 1993). Before we do that, we establish a useful fact, namely that Polish reflexives do not have logophoric uses.

8.4.3.1 Logophors in Polish?

Consider again examples (8.58)–(8.62) above. We saw in §8.4.1.1 that adjunct anaphors in embedded finite clauses cannot be bound by matrix subjects. Note that this is so even though the examples are constructed so as to facilitate the point of view construal, a condition for logophoric reading of anaphors exempt from binding theory (Reinhart and Reuland, 1993; Pollard and Sag, 1994). Moreover, the blocking effect cannot be attributed to the intervening (embedded) animate subjects (cf. Xue *et al.* (1994)); as (8.85)–(8.86) show, the sentences without such intervening animate elements are equally unacceptable.

(8.85) *Marek$_i$ chwalił się, że zadanie zostało rozwiązane **swoim**$_i$ **sposobem**.
Mark boasted RM Comp problem Aux$_{passp}$ solve$_{passp}$ Self$_{poss,ins}$ method$_{ins}$
'Mark boasted that the problem was solved with his own method.' (intended)

(8.86) *Janek$_i$ bał się, że bieg **swoim**$_i$ **tempem** wyczerpie Ewę.
John fear$_{3rd,sg,masc}$ RM Comp run Self$_{poss,ins}$ speed$_{ins}$ exhaust Eve
'John was afraid that Eve's running with his speed will exhaust her.' (intended)

This suggests that in Polish anaphors cannot have logophoric uses. This conclusion is confirmed by the unavailability of long-distance binding in the *picture*-contexts, cf. (8.87)–(8.88), as well as in coordination contexts, cf. (8.89) on the basis of Reinhart and Reuland (1993, (26a)).

(8.87) *Janek był zły na Marię. To swoje zdjęcie / zdjęcie siebie w gazecie narobi
John was angry at Mary this Self$_{poss}$ photo / photo Self$_{gen}$ in newspaper make
dużo hałasu.
much noise

'John was angry at Mary. This picture of himself in the paper will make a lot of noise.' (intended)

(8.88) Janek$_i$ chciał, żeby Maria$_j$ naszkicowała wizerunek siebie$_{*i/j}$ na koniu.
John wanted Comp Mary sketch picture Self$_{gen}$ on horse.

'John wanted Mary to sketch a picture of *himself/herself on a horse.'

(8.89) Maks$_i$ chwalił się, że królowa$_j$ zaprosiła Łucję i siebie$_{*i/j}$ na drinka.
Max$_{nom}$ boasted RM that queen$_{nom}$ invited Lucy$_{acc}$ and Self$_{acc}$ for drink

'Max boasted that the queen invited Lucy and himself for a drink.'

Also the strict c-command requirement on antecedents of anaphors, cf. (8.63) above and (8.90) below, corroborates this conclusion: as it is now well-known, logophors can have a "subcommanding" antecedent, cf. English (8.91) (from Zribi-Hertz (1989)) and Chinese (8.92) (from Xue *et al.* (1994)).

(8.90) Wybuchowość Bismarcka$_i$ obróciła się przeciwko sobie$_{*i}$.
impulsiveness Bismarck$_{gen}$ turned RM against Self

'Bismarck's impulsiveness has rebounded against himself.'

(8.91) Bismarck$_i$'s impulsiveness has... rebounded against himself$_i$.

(8.92) Zhangsan$_i$ de jiaoao hai-le ziji$_i$.
Zhangsan DE pride hurt-ASP Self

'Zhangsan's pride harmed him.'

Thus, in view of the above considerations, and since we are not aware of any long-distance uses of anaphors in Polish, we conclude that Polish anaphors cannot be used logophorically.[26]

8.4.3.2 Binding in HPSG

Polish binding facts posit a challenge to the binding theory of Pollard and Sag (1992, 1994). First of all, their theory deals only with cases of local binding, within one argument structure.[27] This is obviously not enough to account for Polish facts.[28]

[26] The data discussed by Rappaport (1986b) suggest that also the Russian reflexive *sebe* (and, possibly, the possessive reflexive *svoj*) cannot be used logophorically. It is not clear to us if this is a pan-Slavic feature.

[27] The alternative in Pollard and Sag (1994, §6.8.3) slightly extends this domain of binding, but this does not suffice to account for the facts mentioned below.

[28] Examples (8.93)–(8.95) are derived from Marciniak (1999), and (8.96)–(8.97) — from Willim (1989).

(8.93) Jan$_i$ pokazał Piotrowi$_j$ swoje$_{i/*j}$/jego$_{*i/j}$ zdjęcia.
John$_{nom}$ showed Peter$_{dat}$ Self$_{poss}$/his$_{acc}$ pictures$_{acc}$
'John showed Peter his pictures.'

(8.94) Jan$_i$ pokazał Piotrowi$_j$ zdjęcia córki brata swojego$_{i/*j}$/jego$_{*i/j}$
John$_{nom}$ showed Peter$_{dat}$ pictures$_{acc}$ daughter$_{gen}$ brother$_{gen}$ Self$_{poss}$/his$_{gen}$
kolegi.
colleague$_{gen}$
'John showed Peter the pictures of his colleague's brother's daughter.'

(8.95) Jan$_i$ kazał Piotrowi$_j$ kupić sobie$_{i/j}$/mu$_{*?i/*j}$ książkę.
John$_{nom}$ ordered Peter$_{dat}$ buy$_{inf}$ Self/him$_{dat}$ book$_{acc}$
'John ordered Peter to buy himself/him a book.'

(8.96) stosunek Chomsky'ego$_i$ do swoich$_i$ (własnych) studentów...
attitude Chomsky$_{gen}$ to Self$_{poss,gen}$ (own$_{gen}$) students$_{gen}$
'Chomsky's attitude to his own students...'

(8.97) stosunek Chomsky'ego$_i$ do artykułów o sobie$_i$...
attitude Chomsky$_{gen}$ to articles$_{gen}$ about Self$_{loc}$
'Chomsky's attitude to articles about himself...'

In none of examples (8.93)–(8.97) is the anaphor on the same argument structure as the antecedent. In (8.93) the possessive reflexive *swoje* is a dependent (probably specifier) of the noun *zdjęcia*, while the antecedent *Jan* is the subject of the verb *pokazał*. There is no sense in which the anaphor could be present on the argument structure of the verb *pokazał*, or the antecedent on the ARG-ST of *zdjęcia*. This is confirmed by (8.94), which shows that the structural distance between the binder and the anaphor is in principle unbounded. (8.95) shows on the other hand that anaphors can be bound across infinitival clauses, although this can be accounted for by a 'clause-union'-kind of analysis.[29] The third kind of non-locality of binding in Polish is illustrated with (8.96)–(8.97): again, to posit that the subject (or specifier) of the higher noun (*Chomsky'ego*) and the anaphor dependent of the lower noun (*swoich*, *sobie*) can be found on the same ARG-ST would be straining one's credulity.

It is clear, then, that the binding theory of Pollard and Sag (1992, 1994) cannot be straightforwardly adopted to Polish. Of course, there is nothing wrong about that: that theory was formulated for English and it never pretended to account for languages with non-local syntactic binding. However, such an extension is put forward in Xue *et al.* (1994). On their account, languages with long-distance binding have anaphors of the *z-pronoun* sort, i.e., anaphors, which are subject to PRINCIPLE Z:

(8.98) PRINCIPLE Z:

Z-pronouns must be o-bound.

[29] See Przepiórkowski and Kupść (1997c) for such an analysis of Polish infinitival clauses on the basis of Negative Concord and Genitive of Negation, and §5.2.3 for some discussion about 'clause union' effects in Polish.

Moreover, Polish reflexives would have to be analysed as subject-oriented, i.e., satisfying the principle (8.99) (Manning and Sag, 1999, p.67).

(8.99) a. An *a-subject* is an entity that is first on some ARG-ST list.
b. A-subject-oriented anaphors must be [o]-bound by an a-subject.

One problem with such an account is that Polish anaphors do not exhibit a truly long-distance behaviour, they are rather middle-distance anaphors:[30] the dependency is syntactically blocked by independent tense / overt complementizer. This crucially differs from the pragmatic unlike-person blocking effects in Chinese, discussed by Xue *et al.* (1994). The apparently pragmatic nature of blocking allows them to maintain a conceptually elegant syntactic binding theory for Chinese, as presented in (8.98). On the other hand, the apparently syntactic blocking constraint in Polish would have to be built in into the binding theory for this language. This would somewhat endanger the conceptual chastity of the HPSG binding theory.[31]

Another problem stems from the fact that "crucially, adjuncts do not participate in the obliqueness hierarchy" (Xue *et al.*, 1994). This means that the subject of a verb does not o-command (or locally o-command) adjuncts of this verb.[32] For example, in none of (8.58)–(8.62) above does the embedded subject (locally) o-command the adjunct-contained anaphor. This in turn means that these anaphors are exempt from the binding theory of Pollard and Sag (1992, 1994); Xue *et al.* (1994), i.e., that they are logophors. However, as we argued at length above, Polish does not allow logophoric uses of reflexive pronouns and, moreover, the anaphors in (8.58)–(8.62) behave in all respects just like argument-contained anaphors, so they should be subject to the same binding theory. The only way out we see is to parameterize the categorical statement from Xue *et al.* (1994) cited above and say that in some languages (at least some) adjuncts do participate in the obliqueness hierarchy.

Finally, a problem which may prove more difficult to deal with than the ones discussed above concerns personal pronouns. Consider again examples (8.93)–(8.95) above. In all these examples, the personal pronoun (possessive in (8.93)–(8.94)) with the index i is locally o-free. Thus, in (8.93)–(8.94) *jego*$_i$ is either the only element on the noun's (*zdjęcia* and *kolegi*, respectively) ARG-ST, or is analysed as an adjective and perhaps is not on this ARG-ST at all; in any case it is locally o-free. In (8.95), on the other hand, the pronoun *mu*$_i$ is locally o-free on the argument structure of *kupić* because the only preceding element has a different index (j). Thus, according to the HPSG binding theory, these sentences should be acceptable on the reading on which the pronoun is coindexed with *Jan*. This prediction is, however, not borne out.

Although the facts are admittedly much more subtle than it might seem from the discussion above,[33] they suggest that also Pollard and Sag's Condition B should be replaced with a more

[30]See Reuland and Koster (1991) and other papers in Koster and Reuland (1991).

[31]However, since very similar blocking effects show up in Slavic negative concord (NC), this blocking constraint could be formulated as a constraint on a class of dependencies, including binding and negative concord. See Progovac (1988, 1991, 1993, 1994) for an analysis of NC in terms of binding, and Przepiórkowski and Kupść (1997a,c,b, 1999) for a different stance.

[32]This characteristic is crucial for Xue *et al.* (1994), cf. the account of their example (32).

[33]Note, e.g., that the coindexation of *mu* with the higher subject *Jan* in (8.95) does not seem as bad as with the lower subject *Piotrowi*, although this might be due to the "distance factor." Thus, in (i) such coindexation

non-local alternative.

To summarize, we pointed out some issues which any adaptation of the binding theory of Pollard and Sag (1992, 1994), Xue *et al.* (1994), and Manning and Sag (1998, 1999) to the Polish facts must face. First, it must account for the middle-distance orientation of Polish reflexives; Principle A of Pollard and Sag (1992, 1994) is too strong for this task, while Principle Z of Xue *et al.* (1994) is too weak. Second, it must account for the fact that, in Polish, adjuncts are subject to the same binding constraints as arguments. Thus, if binding is to be formulated in terms of obliqueness hierarchy (Pollard and Sag, 1992, 1994; Xue *et al.*, 1994) or argument structure (Manning and Sag, 1998, 1999), this obliqueness hierarchy (argument structure) must be extended to adjuncts in Polish. This, in turn, begs the question, to what extent can such an extension be parameterized across languages. Finally, not only should such an adaptation account for middle-distance anaphors, but it also must explain the fact that, in general, pronouns cannot be bound within such a middle-distance domain.

For the sake of brevity and coherence, we leave these issues unresolved here. They certainly deserve a dissertation of its own.

8.4.3.3 *Reflexivity* Approach

Before we examine how the binding theory of Reinhart and Reuland (1991, 1993) squares with Polish facts, we have to explicate their approach.

Reinhart and Reuland (1991, 1993) First of all, Reinhart and Reuland (1991, 1993) make a clear distinction between morphologically simplex anaphors (SE anaphors, e.g., Dutch *zich*; they exhibit cross-linguistically the middle-distance behaviour) and morphologically complex anaphors (SELF anaphors, e.g., English *himself*; cross-linguistically short-distance behaviour, unless in logophoric use). They are both distinguished from pronouns by being referentially impoverished. However, SELF and SE anaphors differ in that only the former can reflexivize a predicate (i.e., overtly mark it as reflexive); SE anaphors and pronouns do not have this function. This is summarized in (8.100).

		SELF	SE	Pronoun
(8.100)	Reflexivizing function	+	−	−
	R(eferential independence)	−	−	+

is clearly ungrammatical.

(i) Piotrowi$_j$ kazał Jan$_i$ kupić mu$_{*i/*j}$ książkę.
Peter$_{dat}$ ordered John$_{nom}$ buy$_{inf}$ Self/him$_{dat}$ book$_{acc}$
'It's Peter that John ordered to buy him a book.'

Another problem, noted by Willim (1989), is that the reflexive vs. personal pronoun complementarity breaks down in sentences such as (8.96)–(8.97), which allow the personal pronoun in the place of the anaphor with just a slightly degraded acceptability. See also fn.23 on page 329. One possibility to explore is that the pronouns in such contexts are "short distance pronouns" in the sense of Tenny (1996), i.e., that they behave logophorically. Another — that *Chomsky'ego* in these examples is in some sense ambiguous between the agent or author (licensing the reflexive) and the possessor (allowing the pronoun), cf. Rozwadowska (1995, pp.138–140).

Now, Reinhart and Reuland's binding theory is really a theory of reflexivity; it specifies the necessary and sufficient conditions for a predicate to be reflexive (i.e., have two arguments "identical"). The full binding theory of Reinhart and Reuland (1993) is presented below (their (40)–(41)).[34]

(8.101) *Definitions*

a. The *syntactic predicate* formed of (a head) P is P, all its syntactic arguments, and an external argument of P (subject).
The *syntactic arguments* of P are the projections assigned θ-role or Case by P.

b. The *semantic predicate* formed of P is P and all its arguments at the relevant semantic level.

c. A predicate is *reflexive* iff two of its arguments are coindexed.

d. A predicate (formed of P) is *reflexive-marked* iff either P is lexically reflexive or one of P's arguments is a SELF anaphor.

(8.102) *Conditions*

A. A reflexive-marked *syntactic predicate* is reflexive.

B. A reflexive *semantic predicate* is reflexive-marked.

Thus, Condition A predicts that a SELF argument of a predicate must be coindexed with another argument of the verb, while Condition B says that if two arguments of a predicate are coindexed, this predicate must have a SELF argument (or, otherwise, be inherently reflexive).

This theory does not say anything about SE (simplex) anaphors (apart from the fact that they do not reflexivize a predicate). Instead, Reinhart and Reuland (1991, 1993) adopt the proposal that SE anaphors must attach to an Infl node in order to get their ϕ features.[35] Technically, SE adjoins to the verb first, and then goes to Infl together with the verb. At LF, they can move to higher Infls, but—in accordance with an independent constraint on verbal head movement—the verb (+SE) cannot cross a finite Infl. This implies middle-distance behaviour of SE anaphors, as well as their ambiguity in infinitival contexts.

The Status of *siebie* and *swój* The obvious question to ask is, what is the SE/SELF status of Polish reflexives *siebie* and *swój*. They obviously cannot be (just) SELF anaphors: they do not have to be coindexed with a co-argument (cf. (8.95) above and (8.103) below derived from Reinders-Machowska (1991)), indeed, they do not need a co-argument at all (cf. (8.58)–(8.62), (8.88), (8.93)–(8.94), (8.96)–(8.97)). Thus, if they were SELF anaphors, they would violate Condition A (8.102).

(8.103) Piotr$_i$ czytał artykuł Janka o sobie$_i$.
Peter$_{nom}$ read article John$_{gen}$ about Self$_{loc}$
'Peter read John's article about himself.'

[34] See Reinhart and Reuland (1993) for examples and discussion of the notions *syntactic* / *semantic predicate.*

[35] Zlatić (1996, 1997a) argues against this proposal on the basis of Serbo-Croatian facts, but her argument relies on the assumption that the Serbo-Croatian anaphor *sebe*, being morphologically simplex, is unambiguously a SE anaphor. See the discussion of the status of Polish anaphors below.

Moreover, as we saw above, Polish anaphors, unlike SELF anaphors, are strictly subject-oriented.

The middle-distance subject-oriented behaviour of *siebie* and *swój* (as well as their morphological simplicity) seems to suggest that they are SE anaphors. This, however, cannot be so, minimally for the reason that *siebie* does reflexivize the predicate:[36]

(8.104) Janek$_i$ umył najpierw siebie$_i$, a potem Marię.
John$_{nom}$ washed first Self$_{acc}$ and then Mary$_{acc}$
'John washed himself first, and then Mary.'

(8.105) Tomek$_i$ wysadził siebie$_i$ w powietrze.
Tom$_{nom}$ blew Self$_{acc}$ in air
'Tom blew himself up.'

In order to explain the availability of *siebie* both in strictly local (SELF) and in non-local middle-distance (SE) positions, Reinhart and Reuland (1991, p.310) postulate that this form is actually ambiguous between a SE and a SELF anaphor. This proposal goes quite far in accounting for the Polish data: under appropriate assumptions about head-movement, it can successfully deal with all of (8.58)–(8.63), (8.93)–(8.95), (8.103)–(8.105) above. However, there is no independent evidence of such an ambiguity, not even of the (prosodic) kind discussed by Reuland and Reinhart (1995) in connection with the ambiguity of German *sich*. Moreover, there are at least four empirical problems this approach faces.

3-Place Predicates Consider sentences (8.106)–(8.107) below.

(8.106) a. *Władca podarował niewolnicę$_i$ sobie$_i$ (samej).
ruler$_{nom}$ gave slave$_{fem,acc}$ Self$_{dat}$ Emph$_{fem}$
'The ruler gave the slave to herself.' (intended)

b. *Władca podarował niewolnicy$_i$ siebie$_i$ (samą).
ruler$_{nom}$ gave slave$_{fem,dat}$ Self$_{acc}$ Emph$_{fem}$
'The ruler gave the slave herself.' (intended)

(8.107) *Maria opisała Tomka$_i$ sobie$_i$ (samemu).
Mary$_{nom}$ described Tom$_{acc}$ Self$_{dat}$ Emph$_{masc}$
'Mary described Tom to himself.' (intended)

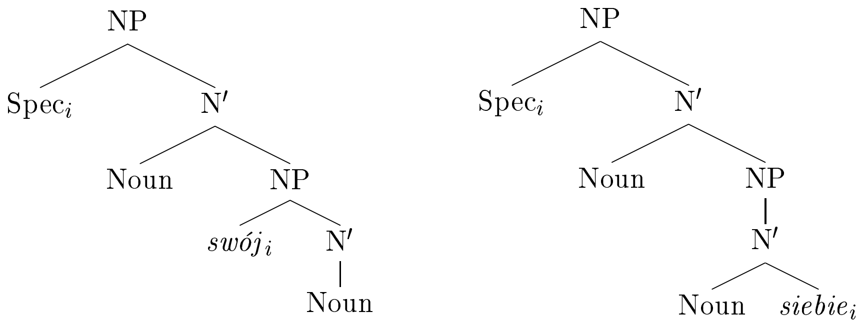
Podarować 'give, donate' and *opisać* 'describe' are three-place predicates. One of the arguments is the anaphor, which is coindexed with another (non-subject) argument thus creating a reflexive predicate. The binding theory presented above predicts this to be ungrammatical on the SE reading of the anaphor (Condition B is violated), but grammatical on the SELF reading (both binding conditions are satisfied), thus the sentences (8.106)–(8.107) should be acceptable. This is not so.

[36]Note that *siebie* cannot be reasonably argued here to be a lexical reflexivity marker: in case of (8.104) this rôle is reserved for *się* (compare *umyć siebie* vs. *umyć się*), while, in case of (8.105), it is not obvious in what sense *wysadzić* (*w powietrze*) should be lexically reflexive.

This problem stems from the fact that in Polish anaphors are always subject-oriented, while the theory sketched above predicts that only SE anaphors are subject-oriented, while SELF anaphors do not have to be. As the glosses show, this prediction is correct for English (Pollard and Sag, 1994, p.256), but not for Polish. This, however, is only a minor problem; Reinhart and Reuland's account for Polish can be minimally modified to the effect that *siebie* is ambiguous between SE and SE+SELF anaphors: the latter are supposed to be both local (i.e., reflexivizing, thus subject to Conditions A and B) and subject-oriented (Reinhart and Reuland, 1991, p.287). The next problem is more serious.

Nominal Subjects Recall that subject-orientedness of SE anaphors is accounted via head-movement to Infl (specifically, to Agr), where the ϕ-features of the subject are available. On the other hand, SELF must be coindexed with a co-argument. Thus, if *siebie* (and *swój*) are ambiguous between SE and (SE+)SELF 'readings', and if there are no logophors in Polish, as we argued above (§8.4.3.1), there are only two kinds of possible antecedents for *siebie*: the strictly local subject or a non-local (middle-distance) subject *of a clause*. This predicts that the following configurations are impossible in Polish:

(8.108)



This prediction is, however, wrong: the two configurations (8.108) correspond to the examples below, as well as to (8.96)–(8.97) above.[37]

(8.109) jego$_i$ ciągłe gnębienie swoich$_i$ studentów...
his constant tormenting Self$_{poss,gen}$ students$_{gen}$

'his constant tormenting/bullying of his own students...'

(8.110) jego$_i$ ciągłe niszczenie artykułów o sobie$_i$...
his constant destroying articles$_{gen}$ about Self$_{loc}$

'his constant destroying of articles about himself...'

It is not clear to us how the account of Reinhart and Reuland (1991, 1993) could be extended to cover such data, short of claiming that the verbal nouns *gnębienie* and *niszczenie* actually introduce the Infl/Agr projection.

[37] The additional complication in (8.96)–(8.97) is the presence of the preposition *do*. Whether this preposition introduces a predicate or not, the anaphors and their antecedents in these examples are not co-arguments of the same predicate, thus our point remains valid.

Pronouns Another empirical problem with the binding theory of Reinhart and Reuland (1991, 1993) concerns pronouns. To cut the long story short, nothing in their account predicts the impossibility of coindexing between the subject and the pronoun in the examples (8.64)–(8.68), repeated below.

(8.64) Ewa$_j$ rozwiązała zadanie **jej**$_{*j}$ **sposobem**.
Eve solved problem her$_{ins}$ method$_{ins}$
'Mary solved the problem with her method.'

(8.65) Marek$_j$ wysłał zaproszenie **jego**$_{*j}$ **samochodem**.
Mark sent$_{3rd,sg}$ invitation his$_{ins}$ car$_{ins}$
'Mark sent the invitation by his car.'

(8.66) Maria$_j$ nie ugotowała **jej**$_{*j}$ obiadu.
Mary NM cooked$_{3rd,sg,fem}$ her$_{dat}$ dinner
'Mary hasn't cooked her the dinner.'

(8.67) Pielęgniarka$_j$ poprawiła poduszkę **jej**$_{*j}$ **mamie**.
nurse corrected pillow her$_{dat}$ mother$_{dat}$
'The nurse moved her mother's pillow.'

(8.68) Ewa$_j$ biegła **jej**$_{*j}$ **tempem**.
Eve ran her$_{ins}$ speed$_{ins}$
'Eve proceeded with her speed.'

Note that condition B is concerned with co-arguments only. Since the pronoun and the subject are not arguments of the same predicate (minimally, because the pronoun is contained in an adjunct), Condition B is (trivially) satisfied. Also the Chain Condition, extended by Reinhart and Reuland (1993) to apply to reflexive and pronominal pronouns (Reinhart and Reuland, 1993, p.696) does not predict this counter-indexing: on most conceptions of chains, the subject and the pronoun do not belong to the same chain because adjuncts are generally barriers to antecedent-government.[38]

Locative Prepositions A similar problem is that arguments of locative prepositions in Polish behave in the same way as arguments of 'case-marking' prepositions (cf. (8.111)–(8.112), based on Reinhart and Reuland (1993, (15)–(16))).

(8.111) a. Maks$_i$ rozmawia z *nim$_i$ / ze sobą$_i$.
Max talk with him$_{ins}$ / with Self$_{ins}$
'Max talks to him/himself.'

b. Maks$_i$ polega na *nim$_i$ / na sobie$_i$.
Max relies on him$_{loc}$ / on Self$_{loc}$
'Max relies on him/himself.'

[38]See Lidz (1997) for further arguments against Reinhart and Reuland's (1993) Chain Condition.

(8.112) a. Maks$_i$ zobaczył pistolet koło *niego$_i$ / koło siebie$_i$.
Max saw$_{3rd,sg}$ gun near him$_{gen}$ / near Self$_{gen}$
'Max saw a gun near him/himself.'

b. Maks$_i$ posadził Łucję koło *niego$_i$ / koło siebie$_i$.
Max placed Lucy near him$_{gen}$ / near Self$_{gen}$
'Max placed Lucy near him/himself.'

This is, again, completely unexpected on the theory of Reinhart and Reuland (1991, 1993) because locative prepositions are predicates, unlike 'case-marking' prepositions. This means that, in the case of locative prepositions, the pronoun is not an argument of the same predicate as the subject of the verb, hence, Condition B does not apply here, ergo, coindexation is possible. As examples (8.112) show, this prediction is not borne out: coindexation with the subject is forbidden in a fashion parallel to 'case-marking' prepositions.[39]

Summary The approach of Reinhart and Reuland (1991, 1993) faces at least the following problems when applied to Polish:[40]

- it is forced to analyse the anaphors *siebie* and *swój* as ambiguous between SE and (SE+)SELF anaphors; this does not square in with the generalization that SELF anaphors are morphologically complex, while SE anaphors are morphologically simplex; also, there is no independent evidence for such ambiguity;[41]
- the fact that Polish anaphors can refer to higher subjects not associated with an Infl node remains unexpected;
- similarly to the analogous problem with the HPSG binding theory, the fact that pronouns (and anaphors) contained within adjuncts behave just like those in arguments is unexpected;
- the prediction that pronouns governed by locative prepositions behave in a different way than those governed by 'case-marking' prepositions is not borne out.

Thus, we conclude that binding theories of Pollard and Sag (1992, 1994) and Xue *et al.* (1994) on one hand, and Reinhart and Reuland (1991, 1993) on the other, which assume a fundamental difference between complements and adjuncts, are not malleable into a successful binding theory for Polish. What is needed instead is a theory insensitive to the putative complement / adjunct dichotomy.

[39]Also Reinhart and Reuland's (1993) Chain Condition does not block examples (8.112), at least under the Barriers (Chomsky, 1986b) conception of government. They could be blocked, however, if one adopted Rizzi's (1990) system, as in fact Reuland and Reinhart (1995) do in order to account for similar German facts, but then it is not clear how to allow the analogous (but grammatical!) English sentences; the answer which Reuland and Reinhart (1995) provide is rather speculative.

[40]In fact, also attempts at applying this approach to other languages, such as Chinese, Korean, Kannada or Malayalam, face immediate problems, as pointed out, e.g., by Lidz (1996, 1997) and Hamilton (1996).

[41]Another minor problem is the following: if *siebie* is ambiguous between SE and SELF, why cannot it be used to lexically mark inherently reflexive predicates (instead *się* must be used as witnessed by the following contrast: *zachowywać się/*siebie* 'behave (oneself)')? A recourse to the 'principles of economy' (Reinhart and Reuland, 1993, fn.15) would not help here, as *siebie* is a strictly impossible lexical reflexivizer, independently of discourse context.

8.5 Negative Concord

Finally, we briefly turn to another phenomenon apparently distinguishing between complements and adjuncts in some languages, i.e., negative concord (NC).[42] For example, Aranovich (1993) claims that, although Spanish *n*-words cannot be licensed across strong barriers (Cinque, 1990), complement (but not adjunct) *n*-words can be licensed across weak barriers.

In Polish, however, there seem to be no differences of this kind. Note first that, as shown in Przepiórkowski and Kupść (1997a,c,b, 1999), *n*-licensing is always illicit across tensed clauses, whether indicative or subjunctive, complement or adjunct. This could be explained by the assumption that all such clauses are strong islands in Polish. However, as mentioned in §8.2.3, *żeby*-clauses allow for extraction in Polish, and yet they are barriers for *n*-licensing:

(8.113) ***Nie** chciałem, żeby Tomek **nikogo** uderzył.
NM wanted$_{1st,sg}$ Comp Tom nobody$_{acc}$ hit
'I didn't want Tom to hit anybody.' (intended)

(8.114) ***Nie** chciałem, żeby Tomek **nigdy** szedł po papierosy.
NM wanted$_{1st,sg}$ Comp Tom never went for cigarettes
'I didn't want Tom to ever be fetching cigarettes.' (intended)

We therefore maintain the claim in Przepiórkowski and Kupść (1997a,c,b, 1999) that Polish NC is not sensitive to the complement/adjunct dichotomy.

A remark concerning binding and NC is in order here.[43] As discussed in Przepiórkowski and Kupść (1997a,b), Polish NC is unbounded in the sense that it can cross any number of PP and NP projections. The same seems to be true of binding. Thus, even when an *n*-word (an anaphor) is embedded deep in an NP or a PP dependent of a verb, it can still be licensed by the negation on the verb (respectively, by the subject of the verb), provided no sentential barrier is crossed. However, this is not always true as the examples below show:

(8.115) a. ?*Według/zdaniem **żadnego** rosyjskiego polityka, Polska **nie** powinna
according to none Russian politician Poland NM should
przystąpić do NATO.
join to NATO
'According to no Russian politician, should Poland join NATO.' (intended)

b. ?*Janek to kanalia, (przynajmniej) według/zdaniem swojego brata.
John is scoundrel at least according to Self$_{poss}$ brother
'John is a scoundrel, at least according to his brother.' (intended)

Thus, in both binding and NC, there are differences in behaviour between various dependents, and, again, these differences do not correlate with the complement/adjunct distinction. At

[42] See Przepiórkowski and Kupść (1997a,c,b, 1999) for a relatively exhaustive HPSG analysis of this phenomenon, as well as Richter and Sailer (1999a), Kupść (1999d), Błaszczak (1998b, 1999, 1998a), Kallas (1998), and Przepiórkowski and Świdziński (1997), Świdziński (1998, 1999a) for related considerations.

[43] We are grateful to Manfred Sailer for bringing this issue to our attention.

least on a first approximation, what seems to matter is rather the eventuality-modifying versus proposition-modifying status of the dependent. This issue certainly deserves further investigation.

8.6 Conclusions

In this Chapter, we discussed various (apparently) syntactic phenomena which have been claimed to correlate with the complement/adjunct distinction and, thus, provide evidence for the syntactic understanding of this dichotomy. We saw that, on closer inspection, none of them really correlates with the dichotomy at hand. In fact, the putative verbal proform *zrobić to* 'do it' turned out to be a pragmatic anaphor, extraction and parasitic gap facts distinguish between various dependents on the basis of their categorial makeup and/or referentiality, and are orthogonal to the complement/adjunct dichotomy, and binding and Negative Concord are completely insensitive to the complement/adjunct status of dependents, although they seem to be sensitive to their eventuality- vs. proposition-modifying status.

Of course, it was not our aim to provide formal analyses of any of these phenomena; each of them requires a separate study. However, in some places, we briefly examined existing analyses and tried to shed some light on what a successful analysis would involve. We hope that at least some of these remarks will stimulate future research on these issues.

Chapter 9

Adjuncts as Complements

In Chapter 6, we saw that the issue whether the complement/adjunct distinction should be represented tree-configurationally is a controversial one: it is so represented within the Principles and Parameters framework, while LFG assumes no such configurational distinction. Within HPSG, there have been proposals reflecting both positions: for Pollard and Sag (1994), adjuncts occupy different positions than complements, while for Pollard and Sag (1987) and Kasper (1994), they have similar configurational status as complements.

Then, in Chapters 7 and 8, we critically examined various apparent reflexes of the putative configurational (or syntactic in general) complement/adjunct dichotomy and saw that none of them stands the scrutiny.

This gives us the freedom to consider in this Chapter an approach to the complement/adjunct dichotomy which is even more radical than that of Pollard and Sag (1987) and Kasper (1994), an approach which denies any configurational difference between complements and adjuncts: adjuncts are syntactically realized from the same valence feature as subcategorized complements, viz. VALENCE|COMPS.

Below, we first review the formalizations of the 'Adjuncts-as-Complements' approach which have been postulated in the HPSG literature (§9.1), then we choose one of them and formalize it in our setup (§9.2), and finally, we show that our formalization correctly interacts with quantification, contrary to appearances (§9.3).[1] In the following Chapter, we apply the analysis of the present Chapter to a range of case assignment phenomena.

9.1 Previous HPSG Work

In this section, we present the most interesting HPSG approaches to the 'Adjuncts-as-Complements' idea, namely Miller (1992), van Noord and Bouma (1994), Manning *et al.* (1997) and Bouma *et al.* (1999b, 1998a), based on a variety of empirical phenomena.

However, the 'Adjuncts-as-Complements' approach to modification has been assumed in a number of HPSG works apart from those. Thus, Bratt (1996) applies this approach in her

[1] Sections 9.2–9.3 are based on Przepiórkowski (1997c, 1998a).

analysis of Korean causative constructions; Abeillé and Godard (1997) and Kim and Sag (1996) utilize it in their accounts of verbal negation in French and English; Przepiórkowski and Kupść (1997b,c,a, 1999) assume it in their analysis of negative concord in Polish; Malouf (1999b) posits that ad-nominal modifiers in West Greenlandic are actually complements, present on COMPS; and Bender and Flickinger (1998, 1999) argue that the 'Adjuncts-as-Complements' idea allows for an elegant explanation of certain diachronic issues.

Moreover, as argued in Przepiórkowski (1997a, 1999b) and, more extensively, in the next Chapter, the 'Adjuncts-as-Complements' approach is almost forced by a range of case assignment facts in a number of languages. Before we can move to those intriguing case assignment facts, though, a look at other empirical arguments and various formalizations of 'Adjuncts-as-Complements' is in order.

9.1.1 Miller (1992)

To the best of our knowledge, the 'Adjuncts-as-Complements' idea was first, within HPSG, put forward by Miller (1992, §§2.2.8–2.2.9), who proposed adding adjuncts to the SUBCAT list in the lexicon, by means of a set of lexical rules. Miller (1992, p.63) presents four arguments for this position:

1. assuming *head-complement* structures as in Pollard and Sag (1987), having adjuncts on the SUBCAT list ensures flat structures of VPs;
2. assuming that agreement is enforced on SUBCAT lists, agreement between a head and its optional modifier (e.g., between a noun and an adjective in French) can be encoded only if one is on the SUBCAT list of the other;
3. including adjuncts on the SUBCAT list "allows [them] to appear at determined positions in the obliqueness hierarchy, which may allow to account for their default ordering properties";
4. finally, absence of adjuncts from the SUBCAT list would result in a violation of the SUBCAT PRINCIPLE.

Although the 'Adjuncts-as-Complements' hypothesis proved to be influential in further HPSG work, the original motivation was rather weak. First, the last point (4.) seems to be void; neither on the treatment of adjuncts in Pollard and Sag (1987) (and Kasper (1994)), nor on the analysis of Pollard and Sag (1994), does the absence of adjuncts from SUBCAT lead to a violation of the SUBCAT (Pollard and Sag, 1987) or VALENCE (Pollard and Sag, 1994) PRINCIPLE. Second, points 1. and 3. are equally inconclusive: the approach of Pollard and Sag (1987) and Kasper (1994) also results in flat structures and allows to include adjuncts at "determined positions in the obliqueness hierarchy." As noted in Pollard and Sag (1987, p.149), since the order of elements on COMP-DTRS is the same as the order on SUBCAT, it also reflects the obliqueness hierarchy; the only difference between Miller's (1992) approach and the analysis of Pollard and Sag (1987) (and Kasper (1994)) is in the locus of linear precedence rules: on the former approach, LP rules must be hard-wired into lexical rules putting adjuncts in appropriate places in the SUBCAT list, while on the latter, LP rules can be understood as operating on values of the DTRS attribute. Finally, also agreement facts (2.) can be accounted for on the assumption that it is not adjunct that is in the SUBCAT list of the head, but rather the other way round, i.e., that the adjunct selects the head. This is the stance of, e.g., Pollard and Sag (1994, ch.2), Kasper (1994) and Kathol (1998), who assume that agreement facts between the head and an adjunct can be encoded through the MOD attribute.

In summary, an analysis, such as Kasper's (1994), upon which adjuncts select heads but are realized as sisters to complements, can handle all the arguments mentioned by Miller (1992) equally well as the 'Adjuncts-as-Complements' approach, although perhaps at the cost of a slightly increased technical complexity. Nevertheless, as we will see presently, there are other important arguments for the 'Adjuncts-as-Complements' idea, first (in HPSG) advocated by Miller (1992).

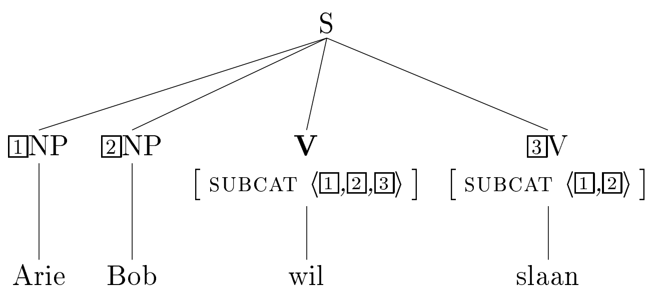
9.1.2 Dutch Verb Clusters: van Noord and Bouma (1994)

9.1.2.1 Linguistic Motivation

A stronger argument for the 'Adjuncts-as-Complements' approach is provided by van Noord and Bouma (1994). Their argument is based on the assumption that Germanic verb clusters, including Dutch verb clusters, should be analysed via the so-called argument composition, proposed within HPSG by Hinrichs and Nakazawa (1990, 1994a). According to that analysis, verb clusters have flat structures; arguments of lower verbs are raised to higher verbs. For example, the subordinate clause (9.1) has the constituent structure as in (9.2).

(9.1) ... dat Arie Bob wil slaan.
... that Arie Bob wants to-hit
'... that Arie wants to hit Bob.'

(9.2)



Now, upon that analysis, clauses such as (9.3) below must be analysed as configurationally unambiguous: the adverbial *vandaag* syntactically attaches to the 'auxiliary' verb *wil*, although, semantically, it may be understood as modifying either the 'auxiliary' verb *wil*, or the 'main' verb *slaan*.

(9.3) ... dat Arie vandaag Bob wil slaan.
... that Arie today Bob wants to-hit
'... that Arie wants to hit Bob today.'

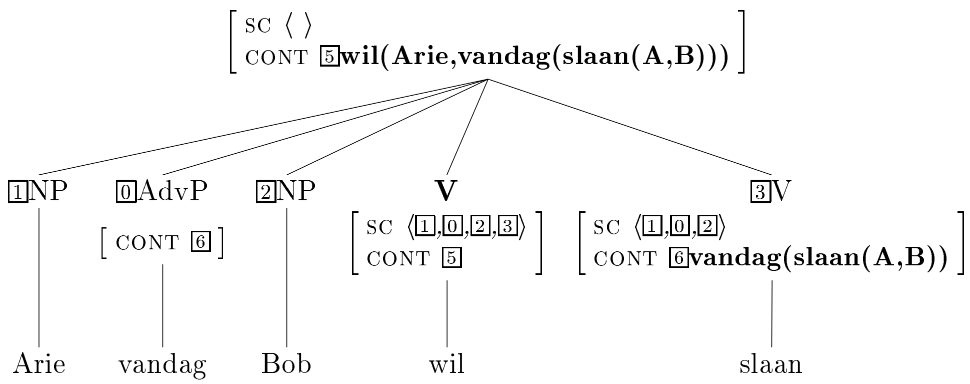
This semantic ambiguity posits a serious problem for the analyses of adjuncts in Pollard and Sag (1987, 1994) and in Kasper (1994): on each of these analyses, the adjunct *vandaag* is predicted to semantically modify the 'auxiliary' verb *wil*, so the reading 'Arie wants to [hit Bob today]' is unaccounted for.

This is where the 'Adjuncts-as-Complements' fares considerably better. Thus, van Noord and Bouma (1994) assume (tentatively) a lexical rule such as (9.4), which puts an adjunct on a lexical item's SUBCAT list and changes the semantics accordingly:[2]

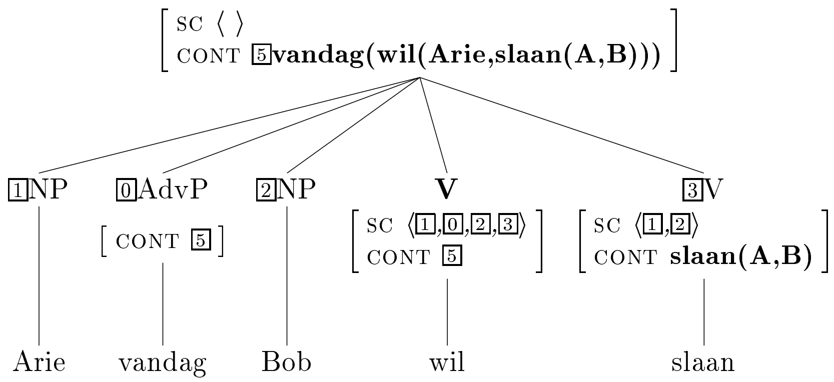
(9.4)
$$\begin{bmatrix} \textsc{subcat}\ \boxed{1} \oplus \boxed{2} \\ \textsc{cont}\ \boxed{3} \end{bmatrix} \Rightarrow \begin{bmatrix} \textsc{subcat}\ \boxed{1} \oplus \left\langle \begin{bmatrix} \textsc{mod}|\textsc{cont}\ \boxed{3} \\ \textsc{cont}\ \boxed{4} \end{bmatrix} \right\rangle \oplus \boxed{2} \\ \textsc{cont}\ \boxed{4} \end{bmatrix}$$

On this approach, the adverbial *vandaag* 'today' can be lexically added either to the SUBCAT list of the 'main' verb *slaan* and appropriately modify its semantics (this leads to the narrow-scope reading), or to the 'auxiliary' verb *wil* (wide-scope reading). This will result in two different analyses of clauses such as (9.3): the narrow-scope reading (9.5), and the wide-scope reading (9.6).[3]

(9.5)



(9.6)



[2] We modified van Noord and Bouma's (1994) lexical rule a little for presentation purposes.

[3] SC abbreviates SUBCAT here, CONT abbreviates, as usual, CONTENT.

9.1.2.2 Formalization: Relational Constraints

The approach of van Noord and Bouma (1994) is interesting also from the formalization point of view. Although van Noord and Bouma (1994) conceptualize the 'Adjuncts-as-Complements' idea with lexical rules, such as (9.4), they actually implement it in Sicstus Prolog in a way that can be relatively easily translated into a fully declarative HPSG formalism, such as RSRL.[4]

Ignoring the issues pertaining to inflection and extraction, van Noord and Bouma's (1994) implementation is given in (9.7).

(9.7)

```
lexical_entry(A) :-
   stem(B), add_adj(B,A).
```

$$\texttt{add\_adj(}\begin{bmatrix} \textit{sign} \\ \text{SUBCAT } \texttt{A} \\ \text{CONT } \texttt{B} \end{bmatrix}\texttt{,}\begin{bmatrix} \textit{sign} \\ \text{SUBCAT } \texttt{J} \\ \text{CONT } \texttt{K} \end{bmatrix}\texttt{) :-}$$

```
   add_adj(A,J,B,K).

add_adj(⟨⟩,⟨⟩,A,A).
add_adj(⟨C|D⟩,⟨C|E⟩,A,B) :-
   add_adj(D,E,A,B).
```

$$\texttt{add\_adj(A,}\langle\begin{bmatrix} \text{MOD } \texttt{B} \\ \text{CONT } \texttt{E} \end{bmatrix}\texttt{|D}\rangle\texttt{,B,C) :-}$$

```
   add_adj(A,D,E,C).
```

On this account, the basic elements in the lexicon are really stems, full words being 'derived' from them via the relation `lexical_entry/2`, especially, via the relation `add_adj/2`. This last relation calls the relation `add_adj/4`. If only the first two definitional clauses of `add_adj/4` are used, then `add_adj/2` behaves as an identity relation and, consequently, the resulting lexical entry has the SUBCAT and the CONTENT values of the initial stem. However, the third clause of `add_adj/4` may add an adjunct in any position of the original SUBCAT list and substitute the CONTENT value of the stem with the CONTENT value of the adjunct. This third clause may be called an arbitrary number of times, so an arbitrary number of adjuncts may be added, each taking the previous CONTENT value as its semantic argument and contributing its own CONTENT value.

This way of looking at lexical rules proved very influential in HPSG and, in fact, the analysis of van Noord and Bouma (1994) is conceptually very similar to the final formalization of 'Adjuncts-as-Complements' of this Chapter.

9.1.3 Japanese Causatives

One of the first applications of the 'Adjuncts-as-Complements' idea within HPSG, apparently independent of van Noord and Bouma (1994), can be found in the first incarnation of the *Lexical Integrity of Japanese Causatives* paper, Iida *et al.* (1994). Since this version does not

[4]The analysis of van Noord and Bouma (1994) is interesting also from the computational point of view as it shows that, thanks to the application of delaying techniques, lexical rules as used in HPSG are computationally tractable. We will not deal with this aspect here.

provide any formalization of the 'Adjuncts-as-Complements' (beyond mentioning a 'Type-Raising lexical rule' and giving an example of its impact), we will discuss here later versions, which do formalize this approach.

9.1.3.1 Manning *et al.* (1997)

Manning *et al.* (1997) (and, earlier, Iida *et al.* (1994)) provide an interesting argument for the 'Adjuncts-as-Complements' from the behaviour of Japanase causatives. They note that causative constructions with an adverb, such as (9.8) below, are ambiguous between a reading on which the adverb modifies the 'causing event' and one on which it modifies the 'caused event'.

(9.8) Noriko ga Masaru ni gakkoo de hasir-ase-ta.
Noriko NOM Masaru DAT school at run-CAUS-PAST

'Noriko made Masaru [[run] [at school]].'
'Noriko [[made Masaru run] [at school]].'

Such ambiguities are often explained by positing different configurational attachment sites of the adjunct: the adjunct may attach either to the phrase headed by the main verb (*hasir* above) or by the causative element (*ase* above). Such an analysis, however, presupposes that the main verb and the causative particle head different projections in syntax, i.e., that they do not constitute a single verbal lexical form. This is exactly the claim that Manning *et al.* (1997) argue at length against, providing a wide range of phonological and morphosyntactic arguments for a lexicalist analysis of Japanese causative constructions. Thus, the analysis of the ambiguity of (9.8) as reflecting the syntactic ambiguity of attachment is unavailable to Manning *et al.* (1997).

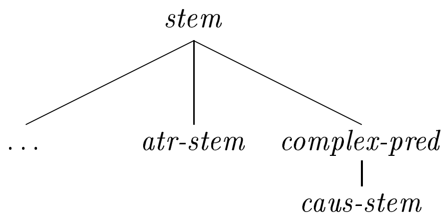
The conclusion that Japanese causative forms, such as *hasir-ase-ta* in (9.8) are lexical items non-decomposable in syntax is problematic for standard (Pollard and Sag, 1994) HPSG assumptions concerning modification, which predict only the wide-scope reading of the adjunct ('Noriko [[made Masaru run] [at school]].'), and not the narrow-scope reading ('Noriko made Masaru [[run] [at school]].'). In other words, the standard HPSG analysis of modification (as well as the analyses in Pollard and Sag (1987) and Kasper (1994)) do not allow sublexical modification.

Manning *et al.* (1997) show, however, that the ambiguity of cases such as (9.8) may be accounted for by adopting the 'Adjuncts-as-Complements' approach to modification. The solution that they propose can be summarized as follows (see below for details):

- there is a lexical process mapping a verbal stem to the corresponding causative stem and changing the semantics appropriately;
- there is a lexical process adding an adjunct to a verbal stem's ARG-ST and changing the semantics appropriately;
- the ambiguity of (9.8) reflects the relative order of application of these two processes.

More specifically, Manning *et al.* (1997) assume a hierarchy of lexical types, a part of which is shown below:

(9.9)



The types *a(dverb-)t(ype-)r(aising)-stem* and *complex-pred(icate)* are derived types and they are appropriate for the *stem*-valued feature LEX-DTR (lexical daughter).[5] Moreover, Manning *et al.* (1997) posit the following implicational constraints on types *atr-stem*, *complex-pred* and *caus-stem*:[6]

(9.10) $$\textit{atr-stem} \rightarrow \begin{bmatrix} \text{PHON } \boxed{1} \\ \text{CONT } \boxed{4}[\text{ARG } \boxed{2}] \\ \text{ARG-ST } \boxed{3} \oplus \langle \text{ADV}[\text{CONT } \boxed{4}] \rangle \\ \text{LEX-DTR} \begin{bmatrix} \text{PHON } \boxed{1} \\ \text{CONT } \boxed{2} \\ \text{ARG-ST } \boxed{3} \end{bmatrix} \end{bmatrix}$$

(9.11) $$\textit{complex-pred} \rightarrow \begin{bmatrix} \text{ARG-ST } \langle \boxed{5}, \boxed{6}, \boxed{3}\langle \text{PRO} | \textit{list} \rangle \rangle \\ \text{LEX-DTR}|\text{ARG-ST } \boxed{3} \end{bmatrix}$$

(9.12) $$\textit{caus-stem} \rightarrow \begin{bmatrix} \text{PHON } \text{F}_{sase}(\boxed{1}) \\ \text{CONT} \begin{bmatrix} \textit{cause-rel} \\ \text{EFFECT } \boxed{2} \end{bmatrix} \\ \text{LEX-DTR} \begin{bmatrix} \textit{v-stem} \\ \text{PHON } \boxed{1} \\ \text{CONT } \boxed{2} \end{bmatrix} \end{bmatrix}$$

Note that the intended effect of (9.10) is similar to that of van Noord and Bouma's (1994) (9.4) (although, unlike (9.4), (9.10) mentions PHON explicitly, it adds the adjunct to the end of ARG-ST and makes slightly different assumptions about semantics).

Let us see how constraints (9.10)–(9.12) account for the ambiguity of (9.8). First, a verbal stem such as (9.13) can be used to derive an *atr-stem* (9.14) or a *caus-stem* (9.15):[7]

(9.13) $$\begin{bmatrix} \textit{stem} \\ \text{PHON } \boxed{1} \\ \text{CONT } \boxed{2} \\ \text{ARG-ST } \boxed{3} \end{bmatrix}$$ (= $\boxed{(9.13)}$ below)

[5] Such derived types can be thought of as so-called Description-level Lexical Rules (DLRs; cf. Meurers (1995)). Manning *et al.* (1997) themselves invoke Riehemann (1993, 1995).

[6] '$\text{F}_{sase}(\boxed{1})$' in (9.12) is a function adding the phonology of the causative particle to the phonology of the stem.

[7] Note that *caus-stem* is a subtype of *complex-pred*, so the constraints on objects of the latter type apply to objects of the former as well.

(9.14)
$$\begin{bmatrix} \textit{atr-stem} \\ \text{PHON } \boxed{1} \\ \text{CONT } \boxed{4}[\text{ARG } \boxed{2}] \\ \text{ARG-ST } \boxed{3} \oplus \langle \text{ADV}[\text{CONT } \boxed{4}] \rangle \\ \text{LEX-DTR } \boxed{(9.13)} \end{bmatrix} \qquad (= \boxed{(9.14)} \text{ below})$$

(9.15)
$$\begin{bmatrix} \textit{caus-stem} \\ \text{PHON } \text{F}_{sase}(\boxed{1}) \\ \text{CONT } \begin{bmatrix} \textit{cause-rel} \\ \text{EFFECT } \boxed{2} \end{bmatrix} \\ \text{ARG-ST } \langle \boxed{5}, \boxed{6}, \boxed{3}\langle \text{PRO} | \textit{list} \rangle \rangle \\ \text{LEX-DTR } \boxed{(9.13)} \end{bmatrix} \qquad (= \boxed{(9.15)} \text{ below})$$

Second, taking (9.14) to be the value of LEX-DTR in a *caus-stem* object, and (9.15) to be the value of LEX-DTR in an *atr-val*, we get (9.16) and (9.17), respectively:

(9.16)
$$\begin{bmatrix} \textit{caus-stem} \\ \text{PHON } \text{F}_{sase}(\boxed{1}) \\ \text{CONT } \begin{bmatrix} \textit{cause-rel} \\ \text{EFFECT } \boxed{4}[\text{ARG } \boxed{2}] \end{bmatrix} \\ \text{ARG-ST } \langle \boxed{5}, \boxed{6}, \boxed{3}\langle \text{PRO} | \textit{list} \rangle \oplus \langle \text{ADV}[\text{CONT } \boxed{4}] \rangle \rangle \\ \text{LEX-DTR } \boxed{(9.14)} \end{bmatrix}$$

(9.17)
$$\begin{bmatrix} \textit{atr-stem} \\ \text{PHON } \text{F}_{sase}(\boxed{1}) \\ \text{CONT } \boxed{9}\begin{bmatrix} \text{ARG } \begin{bmatrix} \textit{cause-rel} \\ \text{EFFECT } \boxed{2} \end{bmatrix} \end{bmatrix} \\ \text{ARG-ST } \langle \boxed{5}, \boxed{6}, \boxed{3}\langle \text{PRO} | \textit{list} \rangle, \text{ADV}[\text{CONT } \boxed{9}] \rangle \\ \text{LEX-DTR } \boxed{(9.15)} \end{bmatrix}$$

The main difference between the derived stems (9.16) and (9.17) is in the CONTENT value: in (9.16), the *cause-rel* outscopes the relation introduced by the adjunct (cf. $\boxed{4}$), while in (9.17), the relation introduced by the adjunct (cf. $\boxed{9}$) outscopes the *cause-rel*.[8] This accounts for the ambiguity of sentences involving a causative verb and an adjunct, such as (9.8). Since such ambiguity would be unaccounted for on any of the standard approaches to modification (Pollard and Sag, 1987, 1994; Kasper, 1994), which would predict only the wide-scope reading, Japanese causatives provide an argument for the 'Adjuncts-as-Complements' approach to modification.

9.1.3.2 Manning *et al.* (1998): A Technical Remark

Manning *et al.* (1997) note in a footnote (fn.19) that, since a derived stem contains the stem it was derived from as the value of feature LEX-DTR, all words carry with them their whole derivational history. For example, the *atr-stem* (9.17) has as the value of its LEX-DTR the *cause-stem* (9.15), which, in turn, contains the basic *stem* (9.13). These 'historical' stems are 'visible' in the syntax in the sense that they can be referred to by a syntactic principle. This,

[8]The other difference is in the level of embedding of the adjunct on the ARG-ST list. This is not important for our purposes.

according to Manning *et al.* (1997) is not restrictive enough because "only the SYNSEM value of the highest stem plays any rôle in syntactic analysis." It should be noted that this is not just a particular problem of Manning *et al.*'s (1997) analysis, but rather it is a general conceptual problem with the so-called Description-level Lexical Rules approach (Meurers, 1995), of which Manning *et al.*'s (1997) approach is (or may be thought of as being) an instantiation.

In the apparently final version of the paper, Manning *et al.* (1998) attempt to deal with this problem by invoking lexical rules in the sense of Copestake (1992), which have "the advantages of allowing inheritance within the hierarchical lexicon of HPSG to extend over both stem and word types and derivational types while preserving the locality of information and lexical integrity of words within the syntax that is well-captured within the lexical rules approach" (Manning *et al.*, 1998, pp.15–16). On this approach, the work previously done by the constraint on *atr-stem* (9.10) is taken care of by the derivational type *atr-drv*:

(9.18)

$$\textit{atr-drv}\\ \left[\begin{array}{ll} \text{RESULT} & \left[\begin{array}{l} \textit{atr-stem}\\ \text{PHON } \boxed{1}\\ \text{CONT } \boxed{4}[\text{ARG } \boxed{2}]\\ \text{ARG-ST } \boxed{3} \oplus \langle \text{ADV}[\text{CONT } \boxed{4}]\rangle \end{array}\right]\\ \text{SOURCE} & \left[\begin{array}{l} \text{PHON } \boxed{1}\\ \text{CONT } \boxed{2}\\ \text{ARG-ST } \boxed{3}\end{array}\right]\end{array}\right]$$

Unfortunately, nothing more is said about the rôle of such derivational types in the grammar, so it seems that they should be understood exactly in the sense of Copestake (1992). This, however, does not seem plausible: in Copestake (1992), such derivational types are part of the computational linguistic rule-based system with (default) unification and (default) inheritance, and thus at least *prima facie* incompatible with current thinking on HPSG as a constraint-based formalism without defaults.[9] Moreover, to the best of our knowledge, all attempts to achieve a formalization of lexical rules or derivational types with all of the properties ascribed to them by Manning *et al.* (1998) have been unsuccessful to date (see discussion in Calcagno (1995) and Meurers (1995, 1999a)), and HPSG work on lexical rules as understood by Manning *et al.* (1998), i.e., on so-called Meta-level Lexical Rules, seems to have been abandoned. For these reasons, we are sceptical about the final (Manning *et al.*, 1998) remarks on formalization of the 'Adjuncts-as-Complements' idea, and, when presenting our approach to quantification in §9.3, we will assume the formalization of derivational types as presented in the non-final version Manning *et al.* (1997), i.e., as—essentially—Description-level Lexical Rules.

9.1.4 Extraction

Another argument for the 'Adjuncts-as-Complements' approach to modification comes from extraction.

As van Noord and Bouma (1994) note in passing, their analysis leads to a more uniform account of extraction than that proposed by Pollard and Sag (1994, ch.9). On the latter account, there are three separate lexical rules handling subject extraction, complement extraction (cf. (9.19)

[9] In particular, it is incompatible with the logic for HPSG which we assume here.

below) and adjunct extraction (cf. (9.20) below), respectively. As van Noord and Bouma (1994) point out, having adjuncts on the same VALENCE list as the complements allows to conflate the last two rules into one.

9.1.4.1 Hukari and Levine (1994, 1995)

Strong empirical arguments for treating adjunct extraction on the par with complement extraction are provided by Hukari and Levine (1994, 1995). They examine a variety of languages in which syntactic extraction is accompanied by certain morpho-syntactic phenomena, which do not occur in the absence of extraction. These phenomena, taking place on the gap-filler path, include stylistic inversion in French, complementizer alternations in Irish, omission of expletive subjects in Icelandic, inversion in Yiddish, downstep suppression in Kikuyu, and gap agreement in Chamorro.[10]

Hukari and Levine (1994, 1995) note that, crucially, in all these languages, adjunct extraction licenses these phenomena, just as complement extraction does. On the basis of this observation, Hukari and Levine (1995) argue against the account of extraction in Pollard and Sag (1994, ch.9), where complements and adjuncts are extracted via two different lexical rules, (9.19) and (9.20):

(9.19) COMPLEMENT EXTRACTION LEXICAL RULE (CELR; Pollard and Sag (1994, p.378)):

$$\begin{bmatrix} \text{SUBCAT } \langle \ldots, \boxed{3}, \ldots \rangle \\ \text{COMPS } \langle \ldots, \boxed{3}[\text{LOC } \boxed{1}], \ldots \rangle \\ \text{INHER}|\text{SLASH } \boxed{2} \end{bmatrix} \Rightarrow \begin{bmatrix} \text{SUBCAT } \langle \ldots, \boxed{4}\begin{bmatrix}\text{LOC } \boxed{1} \\ \text{INHER}|\text{SLASH } \{\boxed{1}\}\end{bmatrix}, \ldots \rangle \\ \text{COMPS } \langle \ldots \quad \ldots \rangle \\ \text{INHER}|\text{SLASH } \{\boxed{1}\} \cup \boxed{2} \end{bmatrix}$$

(9.20) ADJUNCT EXTRACTION LEXICAL RULE (AELR; Pollard and Sag (1994, p.387)):

$$\begin{bmatrix} \text{COMPS } \langle \ldots, \boxed{2}\text{V}''[\text{SUBJ } \langle\rangle], \ldots \rangle \\ \text{INHER}|\text{SLASH } \{\} \end{bmatrix} \Rightarrow \begin{bmatrix} \text{COMPS } \langle \ldots, \boxed{2}, \ldots \rangle \\ \text{INHER}|\text{SLASH } \{\text{Y}''[\text{MOD } \boxed{2}]{:}\boxed{3}\} \\ \text{CONT}|\text{SOA-ARG } \boxed{3} \end{bmatrix}$$

One of the problems with the LR in (9.20) that Hukari and Levine (1995, p.224) note is that the adjunct extracted from a clause is actually not registered on this clause's SLASH value; it is registered only on the SLASH value of the element subcategorizing for that clause, from where it may 'percolate' upwards.[11] This is problematic on two counts: First, the AELR (9.20) does not allow extraction out of matrix clauses; this runs counter to the facts reported in Hukari and Levine (1994, 1995), which show that matrix adjunct extraction triggers the extraction-specific phenomena. Second, if the nonempty SLASH originates only on the item subcategorizing for the clause from which an adjunct is extracted, then there is no information within this clause that something was extracted. Thus, the extraction-specific phenomena should not occur within such clauses. This is, again, refuted by the cross-linguistic evidence adduced by Hukari and Levine (1994, 1995), which clearly shows that adjunct extraction is registered on such host clauses.

[10] See Bouma *et al.* (1999b) for a longer list of languages exhibiting extraction-sensitive phenomena.

[11] Note the difference in this respect between the CELR (9.19) and the AELR (9.20): unlike adjuncts, complements are registered on the head of the clause in which they originate.

9.1.4.2 Bouma *et al.* (1999b, 1998a)

Although Hukari and Levine (1994, 1995) do not argue for the 'Adjuncts-as-Complements' approach, their observations and criticisms are the starting point for Bouma *et al.* (1999b, 1998a), who provide one of the most worked-out versions of this idea to date.[12] Below, we will present those aspects of their analysis which are most important for the realization of the 'Adjuncts-as-Complements' idea.

Basics First of all, Bouma *et al.* (1999b, p.6) introduce an attribute DEP(endent)S, which is, in addition to attributes VALENCE and ARG-ST, appropriate for *category*:

(9.21)
$$\begin{bmatrix} \textit{category} & \\ \text{VALENCE} & \begin{bmatrix} \text{SUBJ} \ \textit{list(synsem)} \\ \text{SPR} \ \textit{list(synsem)} \\ \text{COMPS} \ \textit{list(synsem)} \end{bmatrix} \\ \text{ARG-ST} \ \textit{list(synsem)} & \\ \text{DEPS} \ \textit{list(synsem)} & \end{bmatrix}$$

The rôle of ARG-ST is the same as in Pollard and Sag (1994, ch.9) (where it is called SUBCAT) and in Manning and Sag (1998, 1999): it is the syntactic representation of a word's argument structure and, hence, 1) it is the locus of the HPSG binding theory, 2) it is present only on *word*s, not on *phrase*s. Also VALENCE is, at first sight, just as in Pollard and Sag (1994), i.e., it represents the combinatory potential of a *sign*. What is new here is the attribute DEPS: it collects all dependents of a lexical sign, both arguments (which appear also on ARG-ST) and (some; cf. below) non-arguments (adjuncts). The relation between ARG-ST and DEPS is sketched in (9.22) below (Bouma *et al.*, 1999b, p.11):

(9.22) ARGUMENT STRUCTURE EXTENSION (preliminary version):

$$\textit{verb} \rightarrow \begin{bmatrix} \text{ARG-ST} \ \boxed{1} \\ \text{DEPS} \ \boxed{1} \oplus \textit{list(`adverbial')} \end{bmatrix}$$

Note that these two attributes, ARG-ST and DEPS encode the complement/adjunct distinction: complements of a word are the elements present on the word's ARG-ST, while adjuncts are the elements present on DEPS but not on ARG-ST.

On the other hand, there is no *configurational* difference between complements and (a class of) adjuncts on this account. They are both cancelled off from the COMPS attribute; the presence of adjuncts on COMPS is guaranteed by a principle similar to (9.22), responsible for mapping between DEPS and VALENCE:[13]

(9.23) ARGUMENT REALIZATION (Bouma *et al.*, 1999b, p.12):

$$\textit{word} \rightarrow \begin{bmatrix} \text{VALENCE} & \begin{bmatrix} \text{SUBJ} \ \boxed{1} \\ \text{COMPS} \ \boxed{2} \ominus \textit{list(gap-ss)} \end{bmatrix} \\ \text{DEPS} \ \boxed{1} \oplus \boxed{2} & \end{bmatrix}$$

[12] Earlier versions of Bouma *et al.* (1999b) were widely circulated as Bouma *et al.* (1997, 1998c).

[13] '$\oplus$' represents the operation of concatenation of two lists, while '$\ominus$' represents list difference. Bouma *et al.* (1999b, fn.5) define '$\ominus$' in terms of Reape's (1992) shuffle operator '$\bigcirc$': $(A \ominus B = C) \Leftrightarrow (C \bigcirc B = A)$.

In order to fully understand this principle, we have to sketch Bouma *et al.*'s (1999b) analysis of extraction.

Extraction The main aim of Bouma *et al.*'s (1999b) account, justified by the kind of data considered in Hukari and Levine (1994, 1995), is to provide a unified analysis of extraction dealing with extraction of subjects, complements and adjuncts in a uniform way, and obviating the need for lexical rules such as those in Pollard and Sag (1994, ch.9) (cf. (9.19) and (9.20) above). To this end, they build on Sag (1997) and assume that SLASH values 'percolate upwards' via the principles (9.24)[14] and (9.25), and are retrieved via (9.26) (cf. Sag (1997) and Bouma *et al.* (1999b) for details):[15]

(9.24) SLASH AMALGAMATION CONSTRAINT (SLAC):

$$\textit{word} \rightarrow \begin{bmatrix} \text{LOC}|\text{CAT} & \begin{bmatrix} \text{DEPS} & \langle [\,\text{SLASH}\ \boxed{1}\,], \ldots, [\,\text{SLASH}\ \boxed{n}\,] \rangle \\ \text{BIND} & \boxed{0} \end{bmatrix} \\ \text{SLASH} & (\boxed{1} \cup \ldots \cup \boxed{n}) - \boxed{0} \end{bmatrix}$$

(9.25) SLASH INHERITANCE PRINCIPLE (SLIP):

$$\textit{hd-val-ph} \rightarrow \begin{bmatrix} \text{SLASH} & \boxed{1} \\ \text{HD-DTR}|\text{SLASH} & \boxed{1} \end{bmatrix}$$

(9.26) $$\textit{hd-filler-ph} \rightarrow \begin{bmatrix} \text{SLASH} & \boxed{2} \uplus \boxed{3} \\ \text{HD-DTR}|\text{SLASH} & \boxed{2} \uplus \{\boxed{1}\} \\ \text{NON-HD-DTRS} & \left\langle \begin{bmatrix} \text{LOC} & \boxed{1} \\ \text{SLASH} & \boxed{3} \end{bmatrix} \right\rangle \end{bmatrix}$$

Furthermore, just as in Sag (1997), Bouma *et al.* (1999b) assume that there are no traces in syntactic configurations, and represent gaps as objects of sort *gap-ss*, which is a subsort of *synsem*:

(9.27)

synsem

canon-ss *gap-ss*

(9.28) $$\textit{gap-ss} \rightarrow \begin{bmatrix} \text{LOC} & \boxed{1} \\ \text{SLASH} & \{\boxed{1}\} \end{bmatrix}$$

And, again as in Sag (1997), objects of sort *gap-ss* cannot be SYNSEM values in *sign*s; only objects of sort *canon-ss* can:

(9.29) CANONICALITY:

$$\textit{sign} \rightarrow [\,\text{SYNSEM}\ \textit{canon-ss}\,]$$

[14] In Sag (1997), there was no feature DEPS and the amalgamation of SLASH values was defined on the attribute ARG-ST.

[15] Recall that '∪' indicates set union, while '⊎' indicates disjoint set union.

The crucial difference between the analysis of Sag (1997) and that proposed in Bouma *et al.* (1999b) consists in replacing extraction lexical rules with the ARGUMENT REALIZATION principle (9.23). What this principle says is deceptively simple: the elemnts of the VALENCE attributes SUBJ and COMPS are the elements of DEPS (in the same order) with perhaps some gaps 'missing' in COMPS. Provided that all elements of COMPS are syntactically realized, i.e., become parts of *sign*s, they all must be of sort *canon-ss* (cf. the CANONICALITY principle (9.29) above), i.e., all gaps *must*, in fact, be missing from COMPS. Thus, the effect of (9.23) is that of removing a number of elements from COMPS but still representing them as *gap-ss*s in DEPS.

Semantics The principle (9.22) above is only a preliminary version of the ARGUMENT REALIZATION principle. The full version is given below:

(9.30) ARGUMENT STRUCTURE EXTENSION (Bouma *et al.*, 1999b, p.40):

$$\mathit{verb} \rightarrow \begin{bmatrix} \text{HEAD } \boxed{3} \\ \text{CONT}|\text{KEY } \boxed{2} \\ \text{ARG-ST } \boxed{1} \\ \text{DEPS } \boxed{1} \oplus \mathit{list}(\begin{bmatrix} \text{MOD } \begin{bmatrix} \text{HEAD } \boxed{3} \\ \text{KEY } \boxed{2} \end{bmatrix} \end{bmatrix}) \end{bmatrix}$$

This principle presupposes an approach to semantics different than in Pollard and Sag (1994), namely, so-called Minimal Recursion Semantics of Copestake *et al.* (1997). Explaining this approach would lead us too far afield, so we will be content with mentioning that (9.30) ensures that all adjuncts on DEPS semantically outscope the verb, although their relative scopes remain unspecified. Thus, for example, the two sentences below (from Bouma *et al.* (1998a)) will both have two meanings reflecting the relative scope of *frequently* and *intentionally*.

(9.31) a. Robin reboots the Mac frequently intentionally.

b. Robin reboots the Mac intentionally frequently.

Adjuncts as Complements, or Not Bouma *et al.* (1999b, 1998a) emphasise in a number of places that only some adjuncts are present on DEPS, namely, only the postverbal modifiers, while the preverbal adjuncts are syntactically realized through the standard HEAD-ADJUNCT SCHEMA of Pollard and Sag (1994, pp.56, 403), leading to structures schematically presented in (9.32):

(9.32) HEAD-ADJUNCT SCHEMA:

$$\begin{bmatrix} \mathit{phrase} \\ \text{DTRS } \begin{bmatrix} \mathit{head\text{-}adj\text{-}struc} \\ \text{HEAD-DTR}|\text{SYNSEM } \boxed{1} \\ \text{ADJ-DTR}|\text{SYNSEM}|\text{LOC}|\text{CAT}|\text{HEAD}|\text{MOD } \boxed{1} \end{bmatrix} \end{bmatrix}$$

As we will see below, this is a rather problematic aspect of the analysis of Bouma *et al.* (1999b).

Summary The analysis of Bouma *et al.* (1999b, 1998a) is perhaps the best developed formalization of the 'Adjuncts-as-Complements' idea at the time of writing this study: it shows how adjuncts may be 'added' to the COMPS list without a recourse to lexical rules, it provides an account of extraction, including adjunct extraction, and it deals with a number of semantic issues.

However, in spite of these advantages, the next section will provide a formalization much closer to that of Manning *et al.* (1997), for reasons to be given presently.

9.2 Our Formalization

9.2.1 Disadvantages of Bouma *et al.* (1999b)

9.2.1.1 ARG-ST vs. DEPS

Bouma *et al.*'s (1999b) analysis is elegant in that, although it argues for not distinguishing arguments and (a class of) adjuncts configurationally, it still preserves the distinction that linguists grew up with as a syntactic distinction: arguments are elements of ARG-ST, adjuncts are those elements of DEPS which are not present on ARG-ST.

On the other hand, in the previous three Chapters we carefully re-examined various kinds of evidence for the syntactic complement/adjunct distinction and we saw that none of it stands up to scrutiny. This means that the null hypothesis should be that there is no syntactic distinction between complements and adjuncts, and whatever differences there may be boil down to lexical semantics: complements, but not adjuncts, 'fill a role' in the semantics of lexical items. For this reason, we will prefer a more parsimonious formalization, which does not assume a clear-cut syntactic complement/adjunct dichotomy and which does not posit the new attribute DEPENDENTS.

It should be noted that also Bouma *et al.* (1999b) do not really justify the introduction of this attribute in the first place. They say:

> We are also not proposing to eliminate the distinction between arguments and adjuncts. Arguments appear on ARG-ST, whereas adjuncts may only appear on DEPS. Thus Principle C of the binding theory outlined in [Pollard and Sag (1994)] could remain exactly as formulated there, with the *o-command* relation defined in terms of ARG-ST list, not the DEPS list. This allows o-command to distinguish between the argument PP in (69a) and the adverbial in (69b) for purposes of binding constraints.
>
> (69) a. *I told them$_i$ about [the twins']$_i$ birthday.
> b. I only get them$_i$ presents on [the twins']$_i$ birthday.
>
> (Bouma *et al.*, 1999b, pp.41–42)

This is the only empirical argument Bouma *et al.* (1999b) give for distinguishing complements and adjuncts, and they immediately make this argument void by saying:

> But in fact, there is mounting evidence showing that Principle C is more pragmatic in nature... Hence we would favor a binding theory that includes at most two principles: Principle A... and Principle B...
>
> (Bouma *et al.*, 1999b, p.42)

Thus, in summary, there are no known arguments for making a sharp distinction between arguments and other dependents of the kind allowed by the attribute DEPS.

In fact, it seems that the usefulness of DEPS is mainly technical: it allows to elegantly state that the full argument structure (DEPS) of a word is the list of true arguments of this word (ARG-ST) plus perhaps some adjuncts. Bouma *et al.* (1999b) capture this generalization monotonically (i.e., without having to *change* the value of an attribute) with their ARGUMENT STRUCTURE EXTENSION principle (9.22), repeated below (we ignore semantics here).

(9.22) ARGUMENT STRUCTURE EXTENSION:

$$verb \rightarrow \begin{bmatrix} \text{ARG-ST } \boxed{1} \\ \text{DEPS } \boxed{1} \oplus \textit{list('adverbial')} \end{bmatrix}$$

In order to encode the same principle monotonically but without DEPS, it would be necessary to specify the ARG-ST of *each* lexical item as containing whatever true arguments this lexical item requires plus an additional list of adjuncts, e.g.:

$$(9.33) \quad \begin{bmatrix} \textit{word} \\ \text{PHON likes} \\ \text{ARG-ST } \langle \text{NP, NP} \rangle \oplus \textit{list('adverbial')} \end{bmatrix}$$

This would be a clear case of missed generalization.

9.2.1.2 Passive-Sensitive Adverbs

A much stronger empirical reason for not adopting here Bouma *et al.*'s (1999b) formalization of 'Adjuncts-as-Complements' comes from the consideration of so-called passive-sensitive adverbs.

As extensively discussed in McConnell-Ginet (1982), adverbs such as *reluctantly*, *wisely*, *unwillingly*, *obediently* or *knowingly* relate to (or take as an argument) only the subject in an active sentence, but either the subject or the demoted agent in a passive sentence, at least when occurring in some positions.

(9.34) a. Reluctantly, the doctor examined Mary.
b. Reluctantly, Mary was examined by the doctor.

(9.35) a. The doctor reluctantly examined Mary.
b. Mary reluctantly was examined by the doctor.
c. Mary was reluctantly examined by the doctor.

(9.36) a. The doctor examined Mary reluctantly.
b. Mary was examined by the doctor reluctantly.

Thus, although in (9.34a)–(9.36a), only the agent-subject *the doctor* may be understood as being reluctant, not the patient-object *Mary*, at least in some of (9.34b), (9.35b–c) and (9.36b), *reluctantly* may refer either to the patient-subject *Mary*, or to the demoted agent *the doctor*, i.e., they are ambiguous.[16]

Now, McConnell-Ginet (1982) convincingly argues for an analysis upon which passive sentences such as (9.35c) are ambiguous because the adverb may attach to the verb either before the verb undergoes the rule of passivization, in this case it relates to the agent, or after the rule of passivization, in which case it relates to the promoted patient. In fact, McConnell-Ginet (1982) implements this idea by adopting the 'Adjuncts-as-Complements' approach: adverbs may extend the argument structure of a verb either before or after it undergoes passivization.[17] This is the first extensive 'Adjuncts-as-Complements' analysis in the linguistic literature we are aware of.

It might seem, then, that this analysis should be directly formalizable on any HPSG 'Adjuncts-as-Complements' approach. However, it is problematic for the formalization of Bouma *et al.* (1999b). The problem is that the ARGUMENT STRUCTURE EXTENSION principle is part of the grammar proper, while passivization is assumed in HPSG to be a lexical process. In other words, there is no sense in which the output of the rule or principle that adds adjuncts may be the input of the rule or principle responsible for passivization, and exactly such a relation is necessary in McConnell-Ginet's (1982) account.[18]

The formalization presented in §9.2.2 will be able to preserve the gist of McConnell-Ginet's (1982) analysis.

9.2.1.3 Japanese Causatives

An analogous problem concerns Japanese causatives, discussed in Manning *et al.* (1997). As summarised in §9.1.3 above, although causative *sase* verbs in Japanese come from the lexicon, an adverb may modify either the 'causing event' or the 'caused event'. This is accounted for by an analysis which adds the adverb either to the ARG-ST of the basic verb, before the causative lexical rule, in which case it modifies the 'caused event', or to the ARG-ST of the output of the causative lexical rule, so that it modifies the 'causing event'.

Again, assuming that causative verbs are lexical items, the analysis of Bouma *et al.* (1999b) allows to add adverbs only to the ARG-ST of the final causative verb. On the standard HPSG

[16]The very limited survey that we conducted among native speakers of the American English, in addition to the judgements in McConnell-Ginet (1982), suggests that (9.35c) is understood as ambiguous by all speakers, (9.35b) by many, while (9.36b) and, especially, (9.34b) only by some; when they are not understood as ambiguous, *reluctantly* is taken to modify the patient-subject *Mary*. We are grateful to Sue Brown, Mike Calcagno and Carl Pollard for sharing their judgements with us.

[17]McConnell-Ginet (1982) assumes the transformational account of passivization.

[18]We see two lines of defense for Bouma *et al.* (1999b): to develop a completely different account of passive-sensitive adverbs, e.g., based on the claim that passive-sensitive adverbs may always relate either to the subject or to the agent, or to develop a new theory of passivization, in which verbs with their ARG-ST extended may be the input to passivization. We will not attempt to explore these possibilities here.

approach to semantics, this would predict only the reading in which it is the 'causing event' that is modified.

It should be said that this is not a problem for Bouma *et al.* (1999b), who adopt a different approach to semantics, namely, the so-called Minimal Recursion Semantics (Copestake *et al.*, 1997). As they argue in Bouma *et al.* (1998a), this approach allows them to deal with sublexical scoping, and they take Japanese causatives to be just one of many cases of such sublexical scoping. However, since we are conservative here in adopting the traditional HPSG approach to semantics, such Japanese causatives facts might be problematic for us if we assumed Bouma *et al.*'s (1999b) formalization of the 'Adjuncts-as-Complements' idea.

9.2.1.4 Post- and Pre-verbal Adjuncts

Finally, we would like to point out another problematic aspect of the analysis of Bouma *et al.* (1999b), although it does not really follow from their formalization of the 'Adjuncts-as-Complements' approach. As noted above (p.357), Bouma *et al.* (1999b) assume that only postverbal adjuncts are added to the verb's DEPS, while preverbal adjuncts are realized via the standard HPSG HEAD-ADJUNCT SCHEMA.

This double analysis of adjuncts is justified by the observation that in English, postverbal adjuncts, but not the preverbal ones, can be extracted:

(9.37) a. I think it is likely that Sandy visits Leslie **on Tuesday**.
b. **On Tuesday**, I think it is likely that Sandy visits Leslie __.

(9.38) a. I think Kim **almost** found the solution.
b. ***Almost**, I think Kim __ found the solution.

Unfortunately, the facts (9.37)–(9.38) are not predicted by the analysis, as it stands now. Although the analysis does relate extractability of adjuncts to the possibility of their postverbal occurrence, it does not specify which adjuncts can occur postverbally, and which cannot. On the face of it, both kinds of adjuncts must bear the non-*none* MOD feature, so both should be allowed to occur either preverbally or postverbally, contrary to facts.

Moreover, it is not clear that any such strong correlation really exists. For example, there is a class of adverbs (sometimes called 'modal adverbs') that may occur either preverbally, or sentence-initially, but not postverbally,[19] e.g.:

(9.39) a. John actually got drunk.
b. Actually, John got drunk.
c. *John got drunk actually.

Since *actually* cannot occur postverbally, it is not an element of DEPS, and the sentence-initial *actually* in (9.39b) cannot be analysed as the result of extraction. This means that (9.39b) must be assigned a completely different analysis than (9.40), which Bouma *et al.* (1999b, pp.42–43) assume to involve extraction of *on Tuesday*:

[19]Unless, that is, there is a sharp intonation break equivalent to orthographic full stop.

(9.40) On Tuesday, Sandy visits Leslie.

How could (9.39b) be analysed? Probably via the HEAD-ADJUNCT SCHEMA, just as (9.39a). This means that *actually* may attach either to a VP, as in (9.39a), or to an S, as in (9.39b), i.e., the HEAD-DTR in the HEAD-ADJUNCT SCHEMA (see (9.32) on p.357) should be unspecified as to whether it is an 'almost saturated *phrase*' (e.g., a VP), or a 'fully saturated *phrase*' (e.g., an S). The same analysis would probably apply to (9.34a)–(9.35a), repeated below as (9.41)–(9.42).

(9.41) Reluctantly, the doctor examined Mary.

(9.42) The doctor reluctantly examined Mary.

Here, however, the situation is different because passive-sensitive adverbs, including *reluctantly*, may also appear postverbally, cf. (9.36a), repeated below as (9.43):

(9.43) The doctor examined Mary reluctantly.

Since *reluctantly* may appear postverbally, it may—on the set of assumptions of Bouma *et al.* (1999b)—be a member of DEPS, and so it may be extracted and realized sentence-initially. This means that (9.41), but not (9.39b) or (9.40), is structurally ambiguous between a 'base generation of adjunct' structure and an 'extraction' structure. Since we see no independent reasons for positing such an ambiguity, it seems to be a case of spurious ambiguity.

Another problem with an attempt at relating the linear position of an adjunct to its ability to be extracted comes from examination of adverbs such as *rudely*, which—just as passive-sensitive adverbs—may appear sentence-initially, preverbally, and postverbally, but—unlike passive-sensitive adverbs—have different, but related, meanings in the postverbal and the sentence-initial positions:

(9.44) a. Rudely, Mary answered the Queen.
b. Mary rudely answered the Queen.
c. Mary answered the Queen rudely.

The problem that such examples pose is that, on the analysis of Bouma *et al.* (1999b), (9.44a) should be able to mean the same as (9.44c): since *rudely* in (9.44c) is postverbal, it is present on DEPS and, thus, may be extracted and realized sentence-initially, as in (9.44a).

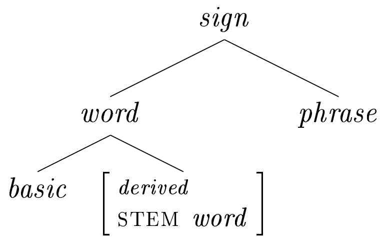
In summary, we doubt whether the correlation suggested by the contrast between (9.37)–(9.38) can be defended once a wider array of data involving more classes of adjuncts is considered and, in any case, a more comprehensive theory is needed to account for various positions of different adjuncts anyway. We suspect that any such theory must take into account, or indeed be based on, inherent meanings of these adjuncts, as argued, e.g., by Jackendoff (1972) and Bellert (1977), and their inherent categorial makeup.

9.2.2 Formalization Based on Manning *et al.* (1997)

Our formalization of the 'Adjuncts-as-Complements' approach is conceptually based on that of Manning *et al.* (1997), although we implement it using different mechanisms; where they invoke lexical type hierarchy, we employ Description-level Lexical Rules (DLRs; cf. Meurers (1995) for discussion), simply because the notion *lexical type hierarchy* is meaningless in the logic for HPSG which we assume here (RSRL).

In particular, we assume that lexical rules are encoded by means of the type *derived*, a subtype of *word*, with a new attribute, STEM, whose value is understood as the input to the lexical rule:

(9.45)



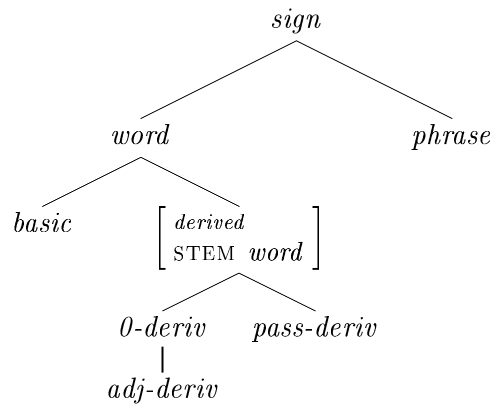
For example, the passivization lexical rule may be (schematically) represented in this setup via *pass-deriv*, a subtype of *derived*, such that objects of this type satisfy the following constraint.[20]

(9.46)
$$pass\text{-}deriv \rightarrow \begin{bmatrix} \text{PHON} & \mathrm{F}_{pass}(\boxed{0}) \\ \text{CAT} & \begin{bmatrix} \text{HEAD} & psp \\ \text{ARG-ST} & \langle \boxed{3}, (\text{PP}[by\ \boxed{2}]) \rangle \oplus \boxed{4} \end{bmatrix} \\ \text{CONT} & \boxed{1} \\ \text{STEM} & \begin{bmatrix} \text{PHON} & \boxed{0} \\ \text{CAT} & \begin{bmatrix} \text{HEAD} & base \\ \text{ARG-ST} & \langle \boxed{2}, \boxed{3} \rangle \oplus \boxed{4} \end{bmatrix} \\ \text{CONT} & \boxed{1} \end{bmatrix} \end{bmatrix}$$

Similarly, adjuncts are added to ARG-ST via an analogous lexical rule, encoded as the type *adj-deriv*, a subtype of *0-deriv*, which represents those lexical rules which do not change the value of the PHON attribute.

[20] F_{pass} marks passive morphophonology here and *psp* stands for passive participle. See Grover (1995) on passivization as rearrangement of *synsem* (or *argument*) members of ARG-ST, and not just their *indices*. Finally, (9.46) probably should not put the demoted subject ($\boxed{2}$) on the ARG-ST of the output; it is often claimed that such agent PPs are 'thematically bound adjuncts', so, on our approach, they should be (optionally) added by to ARG-ST just like other adjuncts, i.e., via (9.49) below; see Sanfilippo (1998, §3) and references therein for discussion of 'thematically bound adjuncts'.

(9.47)



(9.48) $\textit{0-deriv} \rightarrow \begin{bmatrix} \textsc{phon}\ \boxed{0} \\ \textsc{stem}|\textsc{phon}\ \boxed{0} \end{bmatrix}$

(9.49) $\textit{adj-deriv} \rightarrow \begin{bmatrix} \textsc{cat}|\textsc{arg-st}\ \boxed{1} \oplus \langle \mathrm{XP}\begin{bmatrix} \textsc{mod}\ \boxed{2} \\ \textsc{cont}\ \boxed{3} \end{bmatrix}\rangle \\ \textsc{cont}\ \boxed{3} \\ \textsc{stem}|\textsc{synsem}\ \ \boxed{2}\begin{bmatrix} \textsc{cat}|\textsc{arg-st}\ \boxed{1} \end{bmatrix} \end{bmatrix}$

A couple of notes on this formalization of lexical rules in general, and 'Adjuncts-as-Complements' in particular, are in order.

Note first that, trivially, the so-called 'word principle', i.e., the principle introducing lexical items into the grammar, must be stated as a constraint on *basic*, and not *word*; cf. (9.50), where 'LE' stands for 'lexical entry'.[21]

(9.50) $\textit{basic} \rightarrow (\mathrm{LE}_1 \vee \ldots \vee \mathrm{LE}_n)$

Second, since there are no constraints on the value of STEM in (9.49), it can be any *word*, including one of type *adj-deriv*. This means that in principle any number of adjuncts may be (iteratively) added to the ARG-ST of a (*basic*) *word*.

Third, this formalization is compatible with Bouma *et al.*'s (1999b) analysis of extraction, on the assumption that DEPS is replaced with ARG-ST in ARGUMENT REALIZATION and SLASH AMALGAMATION CONSTRAINT:

(9.23′) ARGUMENT REALIZATION (modified):

$$\textit{word} \rightarrow \begin{bmatrix} \textsc{valence} \begin{bmatrix} \textsc{subj}\ \boxed{1} \\ \textsc{comps}\ \boxed{2} \ominus \textit{list(gap-ss)} \end{bmatrix} \\ \textsc{arg-st}\ \boxed{1} \oplus \boxed{2} \end{bmatrix}$$

(9.24′) SLASH AMALGAMATION CONSTRAINT (modified):

$$\textit{word} \rightarrow \begin{bmatrix} \textsc{loc}|\textsc{cat} \begin{bmatrix} \textsc{arg-st}\ \langle\begin{bmatrix}\textsc{slash}\ \boxed{1}\end{bmatrix}, \ldots, \begin{bmatrix}\textsc{slash}\ \boxed{n}\end{bmatrix}\rangle \\ \textsc{bind}\ \boxed{0} \end{bmatrix} \\ \textsc{slash}\ (\boxed{1} \cup \ldots \cup \boxed{n}) - \boxed{0} \end{bmatrix}$$

[21] See Höhle (1999) for discussion on and extensions of such a 'word principle'.

Fourth, although it is not, by any means, our aim to give a complete analysis of passive-sensitive adverbs here, it is instructive to see that they are not problematic for our formalization. We will assume that, at first approximation, passive-sensitive adverbs have lexical entries like (9.51) below.[22]

$$(9.51)\quad \left[\begin{array}{ll} \textit{basic} & \\ \text{PHON} & \text{reluctantly} \\ \text{SYNSEM} & \left[\begin{array}{ll} \text{CAT}|\text{HEAD} & \left[\begin{array}{ll} \textit{adv} & \\ \text{MOD} & \left[\begin{array}{ll} \text{CAT}|\text{VAL}|\text{SUBJ} & \langle \text{NP}_{\boxed{1}} \rangle \\ \text{CONT} & \boxed{2}\textit{psoa} \end{array}\right] \end{array}\right] \\ \text{CONT} & \boxed{2}\ \&\ \left[\begin{array}{ll} \textit{reluctantly} & \\ \text{ARG1} & \boxed{1} \\ \text{ARG2} & \boxed{2} \end{array}\right] \end{array}\right] \end{array}\right]$$

Now, assuming a lexical entry for *examine* such as (9.52), *examine* may undergo passivization, resulting in (9.53), and then have its ARG-ST extended, as in (9.54).

$$(9.52)\quad \left[\begin{array}{ll} \textit{basic} & \\ \text{PHON} & \text{examine} \\ \text{SYNSEM} & \left[\begin{array}{ll} \text{CAT}|\text{ARG-ST} & \langle \boxed{1}\text{NP}_{\boxed{ag}}, \boxed{2}\text{NP}_{\boxed{pa}} \rangle \\ \text{CONT} & \boxed{0}\left[\begin{array}{ll} \textit{examine} & \\ \text{EXAMINER} & \boxed{ag} \\ \text{EXAMINEE} & \boxed{pa} \end{array}\right] \end{array}\right] \end{array}\right]$$

$$(9.53)\quad \left[\begin{array}{ll} \textit{pass-deriv} & \\ \text{PHON} & \text{examined} \\ \text{SYNSEM} & \boxed{4}\left[\begin{array}{ll} \text{CAT}|\text{ARG-ST} & \langle \boxed{2}, (\text{PP}[\textit{by}\ \boxed{1}]) \rangle \\ \text{CONT} & \boxed{0} \end{array}\right] \\ \text{STEM} & \boxed{(9.52)} \end{array}\right]$$

$$(9.54)\quad \left[\begin{array}{ll} \textit{adj-deriv} & \\ \text{PHON} & \text{examined} \\ \text{SYNSEM} & \left[\begin{array}{ll} \text{CAT}|\text{ARG-ST} & \langle \boxed{2}, (\text{PP}[\textit{by}\ \boxed{1}]), \text{XP}\left[\begin{array}{ll} \text{MOD} & \boxed{4} \\ \text{CONT} & \boxed{3} \end{array}\right] \rangle \\ \text{CONT} & \boxed{3} \end{array}\right] \\ \text{STEM} & \boxed{(9.53)} \end{array}\right]$$

Assuming that the relation between ARG-ST and VALENCE is (at first approximation) as specified by the ARGUMENT REALIZATION principle (9.23′), $\boxed{4}$, i.e., the SYNSEM value of the *pass-deriv examined*, will have to satisfy the following description:

$$(9.55)\quad \boxed{4} = \left[\begin{array}{ll} \text{CAT} & \left[\begin{array}{ll} \text{VAL} & \left[\begin{array}{ll} \text{SUBJ} & \langle \boxed{2}\text{NP}_{\boxed{pa}} \rangle \\ \text{COMPS} & \langle \boxed{5}(\text{PP}[\textit{by}\ \boxed{1}\text{NP}_{\boxed{ag}}]) \rangle \end{array}\right] \\ \text{ARG-ST} & \langle \boxed{2}, \boxed{5} \rangle \end{array}\right] \\ \text{CONT} & \boxed{0}\left[\begin{array}{ll} \textit{examine} & \\ \text{EXAMINER} & \boxed{ag} \\ \text{EXAMINEE} & \boxed{pa} \end{array}\right] \end{array}\right]$$

[22] We ignore here semantic complications to do with the possibility of recursive modification; see Kasper (1997). See also Baxter (1999a,b) on conjunctive *psoa*s such as that in (9.51).

Now, assuming that the XP in (9.54) is *reluctantly*, headed by (9.51), the CONTENT of *examined* (and, hence, the whole clause) will be (9.56), i.e., we get the patient-oriented reading.

(9.56)
$$\boxed{3} = \boxed{0}\begin{bmatrix} \textit{examine} & \\ \text{EXAMINER} & \boxed{ag} \\ \text{EXAMINEE} & \boxed{pa} \end{bmatrix} \& \begin{bmatrix} \textit{reluctantly} & \\ \text{ARG1} & \boxed{pa} \\ \text{ARG2} & \boxed{0} \end{bmatrix}$$

Via similar reasoning, but making the *basic* object *examine* the input to *adj-deriv* first, and then making the resulting *adj-deriv* input to *pass-deriv*, we obtain the agent-oriented reading, given below.

(9.57)
$$\boxed{0}\begin{bmatrix} \textit{examine} & \\ \text{EXAMINER} & \boxed{ag} \\ \text{EXAMINEE} & \boxed{pa} \end{bmatrix} \& \begin{bmatrix} \textit{reluctantly} & \\ \text{ARG1} & \boxed{ag} \\ \text{ARG2} & \boxed{0} \end{bmatrix}$$

In summary, the formalization of 'Adjuncts-as-Complements' presented above is able to account for the passive-sensitive adverb modification facts discussed by McConnell-Ginet (1982) in a rather natural way.

Unfortunately, the formalization of 'Adjuncts-as-Complements' presented here is not without its own problems. Foremost, it makes use of so-called Description-level Lexical Rules (Meurers, 1995), which, while being theoretically and technically persimonious, are conceptually controversial, in brief, because they make the input part of the output. For example, the word *examined* described in (9.54) has as its component (STEM value) the word *examined* described by (9.53), which, in turn, contains the word *examine* described in (9.52). Thus, words must 'carry around' their whole derivational histories.

This is especially embarrassing from the point of view of the thesis defended in this study, i.e., that there are no clear differences between complements and adjuncts, apart perhaps from those stemming from considerations of lexical semantics. Since the input of the *adj-deriv* type qua lexical rule is preserved in its output, it is possible to recover the distinction between complements and adjuncts: complements are those elements of an ARG-ST of a word which are also present on the deepest word (of type *basic*) embedded (through STEM) in that word; other elements of this ARG-ST are adjuncts. Thus, the account presented here preserves the complement/adjunct distinction, although in a much more concealed way than the formalization of Bouma *et al.* (1999b).

Both these problems would disappear if we assumed the so-called Meta-leval Lexical Rules (MLRs), which operate outside the grammar proper (Calcagno, 1995). Unfortunately, to the best of our knowledge there is no formalization of MLRs in the logic for HPSG assumed here, so we must be content with our conceptually flawed but technically adequate approach presented above.

In the next section, we will further support this formalization of 'Adjuncts-as-Complements' by showing that, perhaps contrary to appearances, it can easily deal with quantification facts.

9.3 ‘Adjuncts-as-Complements’ and Quantification

In this section, we first present an HPSG approach to quantification which builds on Manning *et al.* (1997)[23] and, especially, Pollard and Yoo (1998) (§9.3.1), but is free from various problems inherent in their analysis (§9.3.2), and then show that this new analysis immediately deals with scope ambiguities involving scope-taking adjuncts and quantifiers (§9.3.3).

9.3.1 Quantification: Pollard and Yoo (1998)

The starting point for Pollard and Yoo (1998) is the problem of the quantification analysis of Pollard and Sag (1994), namely that in sentences like (9.58), only the wide-scope (*de re*) reading of the quantifier is predicted.

(9.58)	a.	A unicorn appears to be approaching.	(ambiguous)
	b.	Sandy believes each painting to be fraudulent.	(ambiguous)
	c.	Five books, I believe John read.	(ambiguous)

The problem stems from the fact that, in Pollard and Sag (1994), a quantifier starts its life only at the surface position of the phrase to which it corresponds and from there it can only percolate upwards. Thus, in (9.58a), the quantifier cannot be in the scope of *appears*, even though it corresponds to the raised subject of *approaching*, which is in the scope of *appears*.

The solution Pollard and Yoo (1998) propose boils down to making the quantifier corresponding to a raised constituent available at the “initial” position, e.g., in (9.58a), at the level of the embedded verb *approaching*. The quantifier can then percolate up and be retrieved either inside or outside the scope of *appear*.

For this idea to work, the QSTORE attribute must be inside *local* values: this way, it is shared between the raised and the initial position in raising constructions (together with the whole *synsem*) and between the extracted element and the trace in unbounded dependency constructions (together with whole *local*). Thus, Pollard and Yoo (1998) (henceforth, PY) propose making QSTORE appropriate for *local*:

$$\text{(PY 12)}\quad \begin{bmatrix} \textit{sign} & \\ \text{PHONOLOGY} & \textit{list(phonstring)} \\ \text{SYNSEM}|\text{LOCAL} & \begin{bmatrix} \text{CATEGORY} & \textit{category} \\ \text{CONTENT} & \textit{content} \\ \text{QSTORE} & \textit{set(quantifier)} \\ \text{POOL} & \textit{set(quantifier)} \end{bmatrix} \\ \text{RETRIEVED} & \textit{list(quantifier)} \end{bmatrix}$$

The two other attributes Pollard and Yoo (1998) employ, POOL and RETRIEVED have book-keeping functions; the former contains the quantifiers to be “disposed of” at a given *sign*, i.e.,

[23] Although an important aspect of our analysis, i.e., lexical retrieval, was first proposed by Manning *et al.* (1997), they do not attempt to develop a fully fledged theory of quantification; for this reason, we present our proposal in comparison with Pollard and Yoo (1998), who do give such a worked-out analysis. Certain features of our proposal, presented earlier as Przepiórkowski (1997c, 1998a), were incorporated into the final version of Manning *et al.* (1997); cf. Manning *et al.* (1998).

either retrieved (they become members of RETRIEVED) or earmarked for percolation higher up (they become members of QSTORE). We give the details presently.

There are three classes of words, according to Pollard and Yoo (1998). First, there are words which collect (amalgamate) quantifiers; this is the default case. They satisfy the following description:[24]

(PY 15) The POOL is the union of the QSTOREs of all *selected arguments*.

The notion of *selected arguments* is necessary to ensure that, e.g., in (9.58a), the quantifier is amalgamated by *approaching*, but not by *appears*. In other words, the (unrealized) subject of the former should be classified as a *selected argument*, while the (realized) subject of the latter should not (if it were, it would be possible to retrieve the quantifier twice: upstairs and downstairs). Pollard and Yoo (1998) provide the following definitions:

- *selected arguments* ((PY 15), p.421): either
  - thematic elements selected via the SUBJ or COMPS feature,
  - elements selected via the SPR feature, or
  - elements selected via the MOD feature.
- an argument is *thematic* (PY, fn.8, p.421) if either
  - the CONTENT of the argument is of sort *nom-obj* and its INDEX value fills a role in the CONTENT|NUCLEUS of the head, or
  - the CONTENT of the argument is of sort *psoa* and fills a role in the CONTENT|NUCLEUS of the head.

The second class consists of words explicitly introducing a quantifier, such as: *a*, *every*, *some*, *someone*, *everybody*, *who*, *when*. Pollard and Yoo (1998) do not provide a description of these words but they assume that their POOL contains the quantifier that these words introduce.

Finally, the third class consists of *semantically vacuous* words (cf. (PY 18) below); in this case POOL is equal to the QSTORE of the complement with which the word shares CONTENT. This class includes the infinitival *to* and the auxiliary *be*.

(PY 18) A lexical head is *semantically vacuous* just in case its CONTENT value is structure-shared with that of one of its complements.

Now at any *sign*, hence also at *word*s of each class, the POOL value is split into RETRIEVED and QSTORE according to the following principle:

(PY 13)
$$\textit{sign} \rightarrow \begin{bmatrix} \text{SYNSEM|LOC} \begin{bmatrix} \text{QSTORE } \boxed{1} \\ \text{POOL } \boxed{2} \end{bmatrix} \\ \text{RETRIEVED } \boxed{3} \end{bmatrix} \\ \wedge \text{ set-of-elements}(\boxed{3},\boxed{4}) \\ \wedge\ \boxed{4} \subseteq \boxed{2} \\ \wedge\ \boxed{1} = \boxed{2} - \boxed{4}$$

[24]"Fundamental to our proposal is the idea that... a word 'collects' all the QSTORE values of its SELECTED ARGUMENTS as its POOL value" (Pollard and Yoo, 1998, p.421).

RETRIEVED represents the quantifiers retrieved at the node: they have to be added to the QUANTS value as specified below.

(PY 22) For a semantically non-vacuous lexical head, the QUANTS value is token-identical with the RETRIEVED value.

(PY 23) For a headed phrase whose CONTENT is of sort *psoa*, the NUCLEUS value is identical with that of the semantic head, and the QUANTS value is the concatenation of the RETRIEVED value and the semantic head's QUANTS value.

Of course, the retrieved quantifiers can be added to the QUANTS list only if there is a QUANTS list, i.e., only if the CONTENT value is of sort *psoa* (as opposed to *nom-obj* or *quant*). If the CONTENT value is not of sort *psoa*, no quantifiers can be retrieved and, in case of phrasal *sign*s, CONTENT value is token identical with that of the semantic head:

(PY 14) $[\,\text{RETRIEVED } \textit{nelist}\,] \rightarrow [\,\text{SYNSEM}|\text{LOC}|\text{CONT } \textit{psoa}\,]$

(PY 24) For a headed phrase whose CONTENT is not of sort *psoa*, the CONTENT value is token-identical to that of the semantic head.

Note that the only constraint on retrieval is that it must happen only on *sign*s whose CONTENT is of sort *psoa*. In particular, quantifiers can be retrieved on *word*s, as well as on *phrase*s (cf. (PY 22) and (PY 23) above).

(PY 13), (PY 14), (PY 23) and (PY 24) above govern retrieval of quantifiers. (PY 21) below is responsible for their percolation.

(PY 21) In a headed phrase, the POOL value is token-identical with the QSTORE value of the semantic head daughter.

This POOL value is then distributed between RETRIEVED and QSTORE according to the principles above.

9.3.2 An Alternative Account

In this section, we first mention some technical and conceptual problems with the account of Pollard and Yoo (1998) and then move to presenting our analysis, which builds upon theirs but avoids those problems.

9.3.2.1 Problems with Pollard and Yoo (1998)

Although the account of Pollard and Yoo (1998) is a significant improvement over the analysis in Pollard and Sag (1994), it is not without its own problems. The foremost is perhaps the problem of spurious ambiguities (of which Pollard and Yoo (1998) are well aware): for example, in (9.58a), there are four possible retrievals corresponding to the narrow reading, and three corresponding to the wide reading.

Secondly, the analysis of Pollard and Yoo (1998) is rather complex. It might well be the case that the complexity lies in the data. However, if a simpler analysis with the same coverage can be obtained, it should be preferred.

Thirdly, it is not immediately compatible with the traceless analyses of extraction (e.g., Pollard and Sag (1994, ch.9), Sag and Fodor (1994), Bouma *et al.* (1999b)). For example, getting the *de dicto* reading of (9.58c) requires *five books* to be a selected argument of the lower verb, *read*. However, under the traceless account of extraction, there is no element on *read*'s VALENCE corresponding to *five books*, hence, the latter is not a selected argument of *read*. Various modifications of Pollard and Yoo's account can be envisaged, depending on the particular formalization of the extraction lexical rules. Clearly, an account of quantifier retrieval independent from particulars of extraction would add to the modularity of the resulting grammar and, hence, should be preferred.

Fourthly, by assuming that each word belonging to the 'amalgamating class' does so by virtue of its lexical properties, the analysis of Pollard and Yoo (1998) misses certain generalizations: the lexical entry of each word in this class must encode the same complex constraint (more on this point below).

Finally, Pollard and Yoo (1998) preserve what we view as a conceptual problem of Pollard and Sag (1994), namely the distribution of a *sign*'s semantics between CONTENT and QSTORE. For example, upon the analysis of Pollard and Sag (1994) and Pollard and Yoo (1998), the phrases *every person* and *some person* have the same values of CONTENT; they differ only in QSTORE. On the other hand, if QSTORE were part of CONTENT, the meaning of a quantifier phrase used in isolation might be read off from its CONTENT.[25] We will see below that making QSTORE part of CONTENT actually simplifies the analysis of quantification.[26]

The analysis presented below is free from the problems mentioned above:[27] it avoids spurious ambiguities, it is simpler in certain respects than that of Pollard and Yoo (1998), and, by shifting weight from VALENCE to ARGUMENT-STRUCTURE, it is orthogonal to the analysis of extraction.

9.3.2.2 Lexical Retrieval

It is obvious that the problem of spurious ambiguities stems from the fact that quantifier retrieval is allowed in too many places; the question is how to constrain those possibilities. We adopt the radical approach, first suggested in Manning *et al.* (1997), of allowing lexical retrieval only. In fact, the preliminary version of our analysis of quantification is formalized as a single constraint on *word* objects, of the form in (9.59).[28]

(9.59) $\quad word \rightarrow \text{Desc}_1 \vee \text{Desc}_2 \vee \text{Desc}_3$

[25] See Stainton (1998) for arguments that such quantifier phrases do have meaning when used in isolations, and that this meaning does not depend on elliptical reading of such isolated quantifiers.

[26] Making QSTORE part of CONTENT was also proposed (on independent grounds) by Frank and Reyle (1995).

[27] However, it implicitly still shares with Pollard and Sag (1994) and Pollard and Yoo (1998) the problem of wrong semantic analysis in cases of recursive modification. This problem is dealt with by Kasper (1997) and, as far as we can see, his solution can easily be adapted to our analysis.

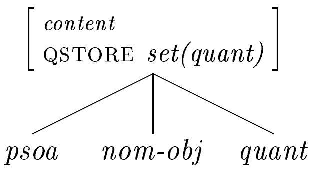
[28] For a moment, we ignore the subtypes of *word* posited in (9.47). The final analysis, consisting in a constraint on *basic*, will be given in §9.3.3.2 (cf., esp., (9.90) on p.383).

The crucial insight of Pollard and Yoo (1998) which we tentatively preserve in our approach is that words should be divided into three classes: the quantifier-amalgamating words (cf. (PY 15) above), the quantifier-introducing words, and the semantically vacuous words. Note, however, that on their account, the characteristic of a given class is a matter of lexical stipulation, rather than governed by general constraints. In particular, it is a matter of lexical stipulation that the POOL of all words belonging to the first class is the union of the QSTOREs of their selected arguments. This, in turn, means that the same complex description must be present in most lexical entries (i.e., lexical entries of words belonging to the first class). This seems to be a clear case of a missed generalization. Similarly, lexical entries of the words belonging to the second class contain the description to the effect that the POOL of these words is the union of the QSTOREs of the selected arguments plus the quantifier(s) introduced by these words. Again, this is more than just the idiosyncratic lexical information.

On our approach, this information is factored out from lexical entries and formalized in the grammar proper as constraint (9.59). In particular, Desc_1 characterizes the quantifier-amalgamating words, Desc_2 describes the quantifier-introducing words, while Desc_3 the semantically vacuous words. What the constraint (9.59) thus says is that each *word* must belong to one of these classes; if it is not a semantically vacuous word or a quantifier-introducing word, than it must satisfy Desc_1, which takes care of quantifier retrieval.

Another important feature of our analysis is that QSTORE is appropriate for *content*, rather than for *local* (as in Pollard and Yoo (1998)) or *sign* (as in Pollard and Sag (1994)). This simple move will allow us to significantly simplify the analysis. (We also do not assume any additional attributes such as POOL and RETRIEVED.) Thus, we modify the sort hierarchy for *content* in the following way:

(9.60)



In the rest of this section, we will first present our analysis in detail by considering $\text{Desc}_{1,2,3}$, then we will illustrate it with an example (§9.3.2.3), and briefly show that it can be extended to handle the *wh*-retrieval facts considered by Pollard and Yoo (1998, §3) (§9.3.2.4).

Semantically Vacuous Words We describe the semantically-vacuous words in a way analogous to that of Pollard and Yoo (1998), but we formalize the notion in terms of ARG-ST to bring it in line with the rest of the analysis: a word is semantically vacuous if it shares its CONTENT value with one of its arguments.

(9.61) $$\text{Desc}_3 = \left[\text{SS}|\text{LOC} \left[\begin{array}{l} \text{CONT}\ \boxed{1} \\ \text{CAT}|\text{ARG-ST}\ \langle \ldots, [\text{CONT}\ \boxed{1}], \ldots \rangle \end{array} \right] \right]$$

Of course, words are semantically vacuous idiosyncratically, by virtue of their lexical semantics; this fact has to be stated in the lexicon. For example, lexical entries for the infinitival *to* and the auxiliary *be* will have the (relevant parts of) lexical entries shown in (9.62)–(9.63). It is clear that any objects satisfying these lexical entries will also satisfy Desc_3, and, hence, also the constraint (9.59).

(9.62)
$$\begin{bmatrix} \textit{word} \\ \textsc{phon}\ \text{to} \\ \textsc{synsem}|\textsc{loc} \begin{bmatrix} \textsc{cat} \begin{bmatrix} \textsc{head}\ \textit{inf}[+\textsc{aux}] \\ \textsc{arg-st}\ \left\langle \boxed{2}, \boxed{3}\mathrm{VP}\begin{bmatrix} \textsc{head}\ \textit{base} \\ \textsc{cont}\ \boxed{1} \\ \textsc{subj}\ \langle \boxed{2} \rangle \end{bmatrix} \right\rangle \end{bmatrix} \\ \textsc{cont}\ \boxed{1} \end{bmatrix} \end{bmatrix}$$

(9.63)
$$\begin{bmatrix} \textit{word} \\ \textsc{phon}\ \text{be} \\ \textsc{synsem}|\textsc{loc} \begin{bmatrix} \textsc{cat} \begin{bmatrix} \textsc{head}\ \textit{verb}[+\textsc{aux}] \\ \textsc{arg-st}\ \left\langle \boxed{2}, \boxed{3}\mathrm{XP}\begin{bmatrix} \textsc{prd}\ + \\ \textsc{cont}\ \boxed{1} \\ \textsc{subj}\ \langle \boxed{2} \rangle \end{bmatrix} \right\rangle \end{bmatrix} \\ \textsc{cont}\ \boxed{1} \end{bmatrix} \end{bmatrix}$$

Note that since QSTORE is an attribute appropriate for *content*, it is automatically shared between the semantically vacuous head and the content-providing argument. Thus, we do not have to make additional assumptions about semantically vacuous words to the effect that "the POOL is simply identical with the QSTORE of the complement with which the word shares CONTENT, and the RETRIEVED is empty" (Pollard and Yoo, 1998, p.423).

Note also that formulating semantic vacuity in terms of ARG-ST rather than COMPS makes the analysis of quantification more independent from particulars of extraction, and thus more modular. To see this point consider the example below:

(9.64) Which bureaucrat do you depend on?

If *on* is considered a semantically vacuous word as suggested in (Pollard and Yoo, 1998, fn.11), then (9.64) is analyseable within their system under the traced analysis of extraction (there is a trace on COMPS), but not under the traceless analysis of the kind proposed in Pollard and Sag (1994, ch.9), Sag and Fodor (1994) or Bouma *et al.* (1999b) (there is no trace on COMPS). On our account, however, either of the analyses of extraction can be assumed because extraction does not remove members of ARG-ST.

Quantifier Amalgamating Words This is where the real action takes place: the majority of words (i.e., all words which are not semantically vacuous and which do not introduce quantifiers) are amalgamating words. Conceptually, Desc_1 is very simple: what such words do is collect QSTORE values of their selected arguments and split them between their QSTORE and QUANTS. The quantifiers which make it to the QUANTS are the retrieved quantifiers, the other ones are earmarked for percolation higher up. Of course, the pool of quantifiers can be split between QSTORE and QUANTS only if there is QUANTS, i.e., only in case of *psoa* CONTENTs; in case of *nom-obj* and *quant*, all the quantifiers end up in QSTORE:

(9.65) $$\text{Desc}_1 = \left[\text{SS|LOC|CONT} \; \begin{bmatrix} \textit{nom-obj} \vee \textit{quant} \\ \text{QSTORE } \boxed{1} \end{bmatrix} \vee \begin{bmatrix} \textit{psoa} \\ \text{QSTORE } \boxed{2} \\ \text{QUANTS } \boxed{3} \end{bmatrix} \right]$$

where $\boxed{1}$ = the union of QSTOREs of selected arguments,
$\boxed{4}$ = the set of elements of $\boxed{3}$,
$\boxed{1} = \boxed{2} \uplus \boxed{4}$.

Note that this formulation is simpler than that of Pollard and Yoo (1998). First of all, (PY 21), (PY 23) and (PY 24) can be replaced by the original (Pollard and Sag, 1994, ch.1) version of the Semantics Principle, namely "For a headed phrase, the CONTENT value is token-identical to that of the semantic head." Since QSTORE is part of CONTENT, this semantic principle will suffice to guarantee percolation of this value, and since all retrieval happens lexically, considering QUANTS and NUCLEUS separately (PY 23) is not necessary. Further, (9.65) supersedes not only (PY 13), but also (PY 14), (PY 15) and (PY 22). This is also the result of allowing only lexical retrieval.

Nevertheless, Desc_1 is still more complex than it should be. The problem lies in the definition of *selected arguments*, which we implicitly borrowed from Pollard and Yoo (1998) (cf. p.368 above). The notion of selected arguments, as defined there, is heterogeneous: it takes into consideration VALENCE features (and the MOD feature) and *thematic* properties of some arguments. Since the only intended effect of these definitions is to prevent a quantifier from being retrieved more than once in cases of raised arguments, it seems reasonable to us to redefine the notion *selected arguments* in these terms: *selected arguments* are those arguments (members of ARG-ST), which are not raised from other arguments. For example, in (9.58a), the synsem element corresponding to *a unicorn* is a selected argument on the ARG-ST of *approaching*, but not on the ARG-STs of *be*, *to*, and *appears* because in each of these cases it is raised from the VP arguments of these verbs.[29]

As in the case of semantically vacuous words, the reformulation in terms of ARG-ST reconciles our analysis of quantification with the traceless approach to extraction.

Quantifier Introducing Words Finally, we will deal with the class of words Pollard and Yoo (1998) have little to say about. Since the information whether a word introduces a quantifier is idiosyncratic, it has to be stated in the lexicon. It might seem at first that these quantifiers should originate as the values of QSTORE. This, however, would be difficult to reconcile with the fact that some quantifier-introducing words (e.g., *once*, *somewhere*) may also amalgamate quantifiers from their arguments: the value of QSTORE cannot be just a set of quantifiers introduced by the word, but it has to be the union of introduced and amalgamated quantifiers. As noted above (p.371), this is more than just the idiosyncratic lexical information.[30]

It seems, thus, necessary to introduce a primitive attribute present on *word*s whose value will

[29] This definition avoids a minor technical problem of Pollard and Yoo's (1998) definition of thematic arguments: it is not clear how to formalize the notion of 'a role in the CONTENT|NUCLEUS' in their definition of thematic arguments, short of enumerating all the attributes appropriate for various subsorts of *qfpsoa*.

[30] Quantifiers cannot originate in QUANTS either: many quantifier-introducing words do not have QUANTS at all (QUANTS is appropriate for *psoa* only). Note also that quantifier-introducing words cannot be characterized as those words, whose CONTENT is of sort *quant*. For example, the CONTENT value of *someone* and *who* is *nom-obj*, while that of *once* and *somewhere* is *psoa*.

be the set of quantifiers introduced by the word. Of course, in most cases this will be the empty set. We will call this attribute NEW-QS (NEW QuantifierS). For example, relevant parts of lexical entries for *a* and *unicorn* look as follows:[31]

(9.66)
$$\begin{bmatrix} \textit{word} \\ \text{PHON a} \\ \text{SYNSEM}|\text{LOC} \begin{bmatrix} \text{CAT} \begin{bmatrix}\text{HEAD } \textit{det}[\text{SPEC N}':\boxed{1}] \\ \text{ARG-ST } \langle\;\rangle\end{bmatrix} \\ \text{CONT } \boxed{2}\begin{bmatrix}\textit{quant}\\ \text{DETERMINER } \textit{exists} \\ \text{RESTIND } \boxed{1}\end{bmatrix}\end{bmatrix} \\ \text{NEW-QS } \{\boxed{2}\}\end{bmatrix}$$

(9.67)
$$\begin{bmatrix} \textit{word} \\ \text{PHON unicorn} \\ \text{SYNSEM}|\text{LOC} \begin{bmatrix} \text{CAT} \begin{bmatrix}\text{HEAD } \textit{noun} \\ \text{VALENCE} \begin{bmatrix}\text{SUBJ } \langle\;\rangle \\ \text{SPR } \langle\boxed{4}\rangle \\ \text{COMPS } \langle\;\rangle\end{bmatrix} \\ \text{ARG-ST } \langle\boxed{4}\rangle\end{bmatrix} \\ \text{CONT } \boxed{1}\begin{bmatrix}\textit{npro}\\ \text{INDEX } \boxed{3} \\ \text{RESTR } \left\{\begin{bmatrix}\textit{unicorn} \\ \text{INST } \boxed{3}\end{bmatrix}\right\}\end{bmatrix}\end{bmatrix} \\ \text{NEW-QS } \{\}\end{bmatrix}$$

Now the quantifier-introducing words can be characterized as words with non-empty NEW-QS. However, for the reason already mentioned above, it will not do to equate the value of QSTORE of such words with their NEW-QS: these words can in principle also amalgamate quantifiers from its arguments. This is, e.g., the case in (9.68) below in the wide-scope construal of *every man*.

(9.68) Every man once loved Marilyn Monroe.

In this example, the adjunct *once* introduces the quantifier '$\exists t$ time(t)', but, at the same time, takes over the quantifier in its MOD value, i.e., '$\forall x$ man(x)'. Thus, the only difference between the quantifier-introducing and the amalgamating items is that the former add their own quantifiers (i.e., those in NEW-QS) to the pool of quantifiers to be distributed between QSTORE and QUANTS:

(9.69)
$$\text{Desc}_2 = \begin{bmatrix} \text{SS}|\text{LOC}|\text{CONT} \begin{bmatrix}\textit{nom-obj} \vee \textit{quant} \\ \text{QSTORE } \boxed{1}\end{bmatrix} \vee \begin{bmatrix}\textit{psoa} \\ \text{QSTORE } \boxed{2} \\ \text{QUANTS } \boxed{3}\end{bmatrix} \\ \text{NEW-QS } \boxed{5}\end{bmatrix}$$

where $\boxed{1} = \boxed{5} \uplus$ the union of QSTOREs of selected arguments,
$\boxed{4} =$ the set of elements of $\boxed{3}$,
$\boxed{1} = \boxed{2} \uplus \boxed{4}$.

[31] The VALENCE information in (9.67) should probably not be a part of the lexical entry. We include it here for perspicuity.

Now, since the NEW-QS of the amalgamating items (Desc_1) is empty, they also satisfy Desc_2. Thus, we can conflate Desc_1 and Desc_2 and obtain the following theory of quantification in HPSG:[32]

(9.70) $\quad$ *word* $\rightarrow \text{Desc}_{12} \vee \text{Desc}_3$

(9.71)
$$\text{Desc}_{12} = \begin{bmatrix} \text{SS}|\text{LOC}|\text{CONT} & \begin{bmatrix} \textit{nom-obj} \vee \textit{quant} \\ \text{QSTORE } \boxed{1} \end{bmatrix} \vee \begin{bmatrix} \textit{psoa} \\ \text{QSTORE } \boxed{2} \\ \text{QUANTS } \boxed{3} \end{bmatrix} \\ \text{NEW-QS } \boxed{5} & \end{bmatrix}$$

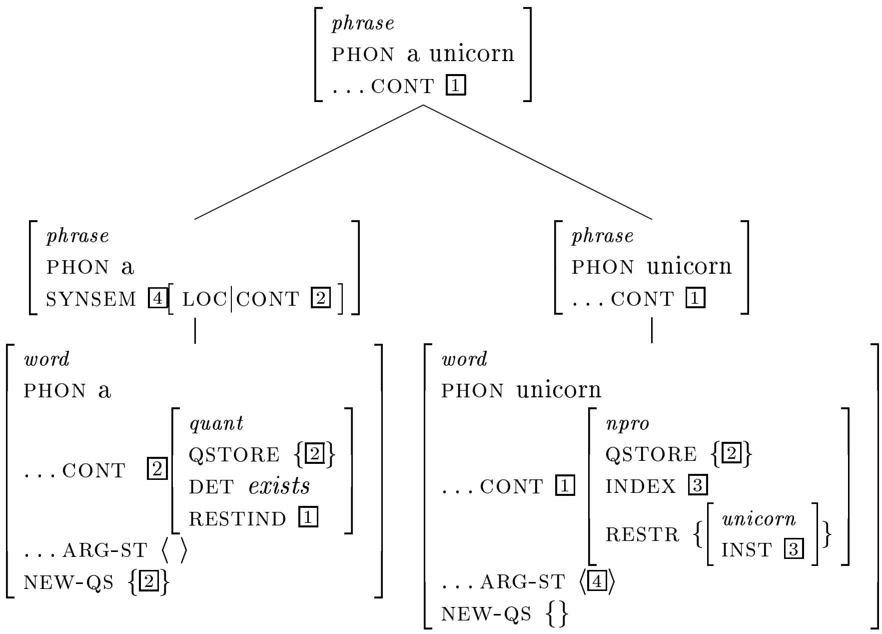
where $\boxed{1} = \boxed{5} \uplus$ the union of QSTOREs of selected arguments,
$\boxed{4} =$ the set of elements of $\boxed{3}$,
$\boxed{1} = \boxed{2} \uplus \boxed{4}$.

(9.61)
$$\text{Desc}_3 = \begin{bmatrix} \text{SS}|\text{LOC}|\text{CONT } \boxed{1} \\ \text{ARG-ST } \langle \ldots, [\text{CONT } \boxed{1}], \ldots \rangle \end{bmatrix}$$

9.3.2.3 *A unicorn appears to be approaching.*

Let us first look at the tree corresponding to *a unicorn*:

(9.72)



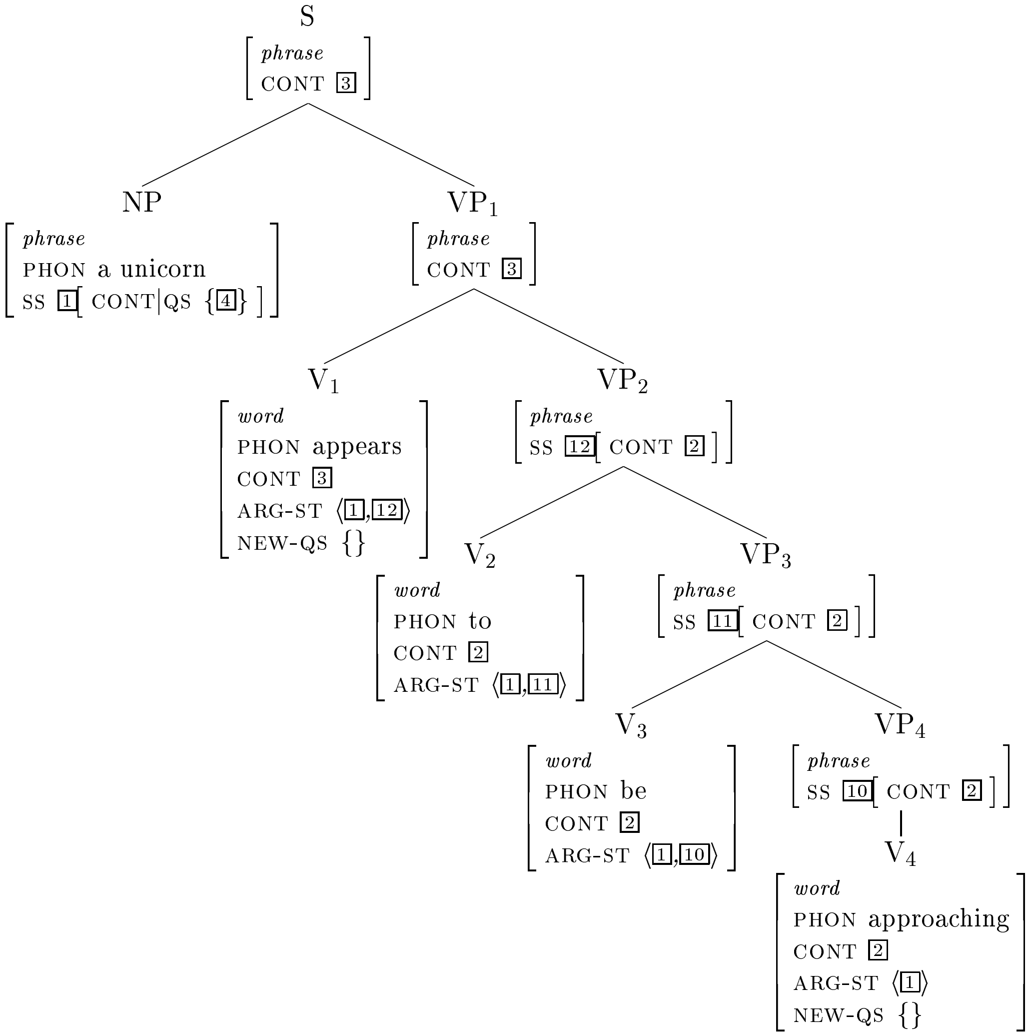
There are two *word* structures in this tree which must satisfy (9.70): *a* and *unicorn*. The former introduces a quantifier in NEW-QS and incorporates it into QSTORE via Desc_{12} (9.71). This value percolates together with the whole CONTENT value to the maximal projection

[32]To make the analysis complete, the standard Semantics Principle (second version) and Quantifier Binding Condition of (Pollard and Sag, 1994, pp.56 and 327, respectively) should be added.

courtesy of the Semantic Principle. Since the synsem of this maximal projection is present in *unicorn*'s ARG-ST, this quantifier is amalgamated, again via Desc_{12}, to the noun's QSTORE. And, again courtesy of the Semantic Principle, it is present on the NP's QSTORE.

Let us now look at the tree structure corresponding to *A unicorn appears to be approaching.*

(9.73)



There are six words in this structure (*a*, *unicorn*, *appears*, *to*, *be*, *approaching*), and they all have to satisfy the constraint (9.70). We have already considered the first two: since they are not semantically vacuous, they must satisfy Desc_{12} (9.71). Another two of them, i.e., *to* and *be*, are semantically vacuous, so they trivially satisfy (9.70) by satisfying Desc_3 (9.61). The last two are, again, semantically non-vacuous and they can satisfy (9.70) only by satisfying Desc_{12}. Before we consider ways in which *appears* and *approaching* can satisfy Desc_{12}, a couple of notes are in order.

First, there are only two CONTENT values of sort *psoa* around. The approaching-*psoa* ($\boxed{2}$) is structure-shared between the verb *approaching* (V_4) and its maximal projection (VP_4) by virtue of the Semantics Principle. This value is then taken over by the semantically vacuous verb *be* (V_3) and, again, structure-shared with the maximal projection (VP_3). Analogously, also the CONTENT value of *to* (V_2) and its projection (VP_2) is $\boxed{2}$. The other *psoa* is the appears-*psoa* ($\boxed{3}$), which is shared by the verb *appears* (V_1) and its projections (VP_1 and S).

Secondly, since both QUANTS and QSTORE are parts of CONTENT, any quantifier retrieval can happen only at the two *psoa*-valued CONTENTs, namely at $\boxed{2}$ and $\boxed{3}$.

Thirdly, there is only one quantifier to be retrieved, i.e., ‘$\exists x$ unicorn(x)’ ($\boxed{4}$). This quantifier originates in the NP *a unicorn*, so the value of this phrase's CONT|QSTORE is $\{\boxed{4}\}$ (see discussion above). The whole SYNSEM value of this NP is structure-shared with the (selected!) argument of *approaching*, hence, the QSTORE value of this selected argument is $\{\boxed{4}\}$, and thus, “the union of QSTOREs of selected arguments” (cf. (9.71)) of *approaching* is $\{\boxed{4}\}$. Since NEW-QS of this verb is empty, the pool of quantifiers to take care of at this node consists only of $\boxed{4}$.

Now there are two ways for *approaching* to satisfy Desc_{12} (9.71): either $\boxed{4}$ becomes the (only) element of QSTORE (and QUANTS is empty), or it becomes the element of QUANTS (and QSTORE is empty). This results in two possible values of CONTENT $\boxed{2}$ illustrated below:

(9.74) a. narrow scope:

$$\boxed{2} = \begin{bmatrix} \textit{psoa} \\ \text{QSTORE } \{\} \\ \text{QUANTS } \langle \boxed{4} \rangle \\ \text{NUCL } \textit{approach} \end{bmatrix}$$

b. wide scope:

$$\boxed{2} = \begin{bmatrix} \textit{psoa} \\ \text{QSTORE } \{\boxed{4}\} \\ \text{QUANTS } \langle\rangle \\ \text{NUCL } \textit{approach} \end{bmatrix}$$

In case of narrow scope (9.74a), the value of QSTORE of *approaching* is the empty set, and so is the value of QSTORE of the only selected argument of *appears*. Hence, the set of quantifiers collected at *appears* is the empty set, i.e.:

(9.75)
$$\boxed{3} = \begin{bmatrix} \textit{psoa} \\ \text{QSTORE } \{\} \\ \text{QUANTS } \langle\rangle \\ \text{NUCL } \textit{appear} \end{bmatrix}$$

On the other hand, in case of wide scope (9.74b), the value of QSTORE of the selected argument of *appears* is the singleton set $\{\boxed{4}\}$, hence, by the same reasoning, there are two possible values of $\boxed{3}$:[33]

[33] Of course, if there is a constraint on root clauses to the extent that their QSTORE be empty, only (9.76a) is possible.

(9.76) a. $\boxed{3} = \begin{bmatrix} \textit{psoa} \\ \text{QSTORE } \{\} \\ \text{QUANTS } \langle\boxed{4}\rangle \\ \text{NUCL } \textit{appear} \end{bmatrix}$

b. $\boxed{3} = \begin{bmatrix} \textit{psoa} \\ \text{QSTORE } \{\boxed{4}\} \\ \text{QUANTS } \langle\rangle \\ \text{NUCL } \textit{appear} \end{bmatrix}$

This exhausts the possibilities of quantifier retrieval. Note that there are no spurious ambiguities and that the *sign*s' semantics is represented only in CONTENT.

9.3.2.4 *Wh*-Retrieval

Pollard and Yoo (1998) make two observations concerning scope of *wh*-elements in English. First, a fronted *wh*-phrase has exactly the scope indicated by the surface realization of the phrase. Second, the quantifier corresponding to an *in situ wh*-phrase (thus, also subject *wh*-phrase) can be retrieved only when there is a left periphery (subject or filler) *wh*-phrase. This can be illustrated with example (9.77) cited by Pollard and Yoo (1998) after Baker (1970).

(9.77) Who remembers where we bought which book?

This example has two readings (given here by possible answers):

(9.78) a. John and Martha remember where we bought which book.

b. John remembers where we bought the physics book and Martha and Ted remember where we bought *The Wizard of Oz*.

These readings are captured by the observations above. First, the extracted phrase *where* must to scope immediately over *bought*. Secondly, *Who* cannot be retrieved any higher than its surface position, so it scopes immediately over *remembers*. However, the quantifier corresponding to *which book* can be retrieved either together with the filler *where*, or together with the subject *Who*, thus giving two possible readings.

On the basis of these observations, Pollard and Yoo (1998) propose the following principle governing scope of *wh*-quantifiers:

(PY 37) Syntactic Licensing Constraint on *Wh*-Retrieval (for 'English-like' syntactic *wh*-movement languages)

a. At any node, retrieval, if any, of *wh*-operators must include the member of the left peripheral daughter's QUE value.

b. At any filler-head node, if the filler has nonempty QUE value, then its member must belong to the node's RETRIEVED value.

Since formalizing this principle requires retrieval at phrases, Pollard and Yoo (1998) claim that "phrase-level retrieval is necessary in our analysis of interrogatives" (p.423).

Note, however, that there is nothing in the original observations that requires phrasal retrieval; they can be easily restated in our approach. First, (PY 37b) is trivially equivalent to the following principle:

(9.79) At any filler-head node, if the filler has nonempty QUE value, then its member must belong to the node's QUANTS value.

Second, (PY 37a) can be replaced by a principle to the effect that whenever a *wh*-operator is retrieved, there must be some retrieval from a left peripheral phrase. More carefully, this can be stated as below:

(9.80) If the QUANTS of a *psoa* contains a *wh*-quantifier, it must also contain the QUE member of a left peripheral daughter of some semantic projection of this *psoa*.

In other words, when a *wh*-quantifier is retrieved at a lexical item, there must be a semantic projection of this item, which is either a head-filler node or a head-subject node such that the left periphery (filler or subject) contains QUE, whose member is also retrieved at the same lexical item.

Note that this formalization involves certain non-locality: although *wh*-quantifiers are retrieved lexically, this retrieval depends on the properties of projections of the lexical item. This is the main difference between our analysis and that of Pollard and Yoo (1998) and it is the price we have to pay for allowing lexical retrieval only. Nevertheless, we do not consider it an excessive price and, in view of the advantages lexical retrieval brings, we are willing to pay it. Appendix A presents a straightforward formalization of our treatment of *wh*-retrieval.

9.3.3 Adjuncts and Scope Ambiguities

Now that we presented an HPSG theory of quantification which is based on Manning *et al.*'s (1997) idea of allowing only lexical retrieval of quantifiers, and which otherwise builds on Pollard and Yoo (1998) but avoids various problems of that analysis, we can show that it correctly interacts with our formalization of 'Adjuncts-as-Complements'.

9.3.3.1 A Problem?

One potential problem for the 'Adjuncts-as-Complements' approach comes from the consideration of examples such as (9.81) below (Calcagno and Kasper, 1997).

(9.81) Kim apparently almost saw two unicorns.

Depending on where the quantifier corresponding to *two unicorns* is retrieved, there are three readings of (9.81):

(9.82) a. apparently(almost($\exists 2u$: unicorn(u) $\wedge$ see(kim,u)))

b. apparently($\exists 2u$: unicorn(u) $\wedge$ almost(see(kim,u)))

c. $\exists 2u$: unicorn(u) $\wedge$ apparently(almost(see(kim,u)))

The apparent problem with the 'Adjuncts-as-Complements' approach is that, on the face of it, it allows only interpretation (9.82c). The reasoning which leads to this conclusion is as follows. Since modification changes verbal semantics, adding an adjunct lexically to a verb's ARG-ST (or COMPS) will result in changing this verb's semantics in the lexicon. On the other hand, quantifier retrieval (also lexical retrieval) happens in the grammar proper, hence, after modification. This forces quantifiers to have wider scope than adjuncts.

The rest of this section is devoted to answering this criticism. First, in §9.3.3.2 we will illustrate the interaction of our formalization of 'Adjuncts-as-Complements' presented in §9.2.2 with the analysis of quantification of §9.3.2, and then, in §9.3.3.3, we will see that this correct interaction does not rely on the formalization of 'Adjuncts-as-Complements' in terms of Description-level Lexical Rules; a Meta-level Lexical Rules approach to 'Adjuncts-as-Complements' can interact with quantification equally naturally.

9.3.3.2 *Kim almost saw a unicorn.*

Let us analyse the two-way ambiguous sentence *Kim almost saw a unicorn.* It will become obvious that this analysis does not depend on the number of adjuncts (or quantifiers).

We assume the following (relevant parts of) lexical entries for *saw* and *almost*:[34]

$$(9.83)\quad \begin{bmatrix} \textit{basic} \\ \text{PHON saw} \\ \text{SYNSEM}|\text{LOC} & \begin{bmatrix} \text{CAT}|\text{ARG-ST} & \langle \boxed{1}_{\boxed{7}}, \boxed{3}_{\boxed{8}} \rangle \\ \text{CONT} & \begin{bmatrix} \textit{psoa} \\ \text{NUCL} & \begin{bmatrix} \textit{see} \\ \text{SEER} & \boxed{7} \\ \text{SEEN} & \boxed{8} \end{bmatrix} \end{bmatrix} \end{bmatrix} \\ \text{NEW-QS} & \{\} \end{bmatrix}$$

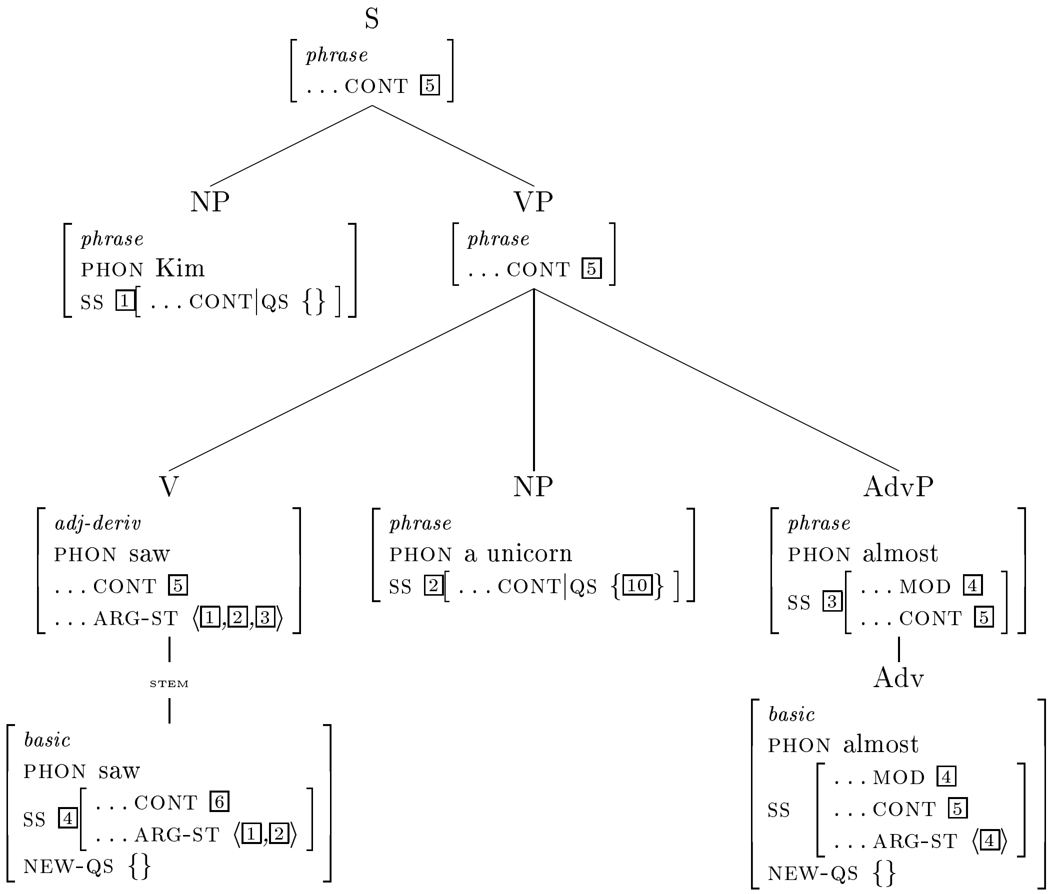
$$(9.84)\quad \begin{bmatrix} \textit{basic} \\ \text{PHON almost} \\ \text{SYNSEM}|\text{LOC} & \begin{bmatrix} \text{CAT} & \begin{bmatrix} \text{HEAD}|\text{MOD} & \boxed{4}\begin{bmatrix} \text{LOC}|\text{CONT} & \boxed{6} \end{bmatrix} \\ \text{ARG-ST} & \langle \boxed{4} \rangle \end{bmatrix} \\ \text{CONT}|\text{NUCL} & \begin{bmatrix} \textit{almost} \\ \text{ARG} & \boxed{6} \end{bmatrix} \end{bmatrix} \\ \text{NEW-QS} & \{\} \end{bmatrix}$$

Assuming the formalization of 'Adjuncts-as-Complements' in §9.2.2, *Kim almost saw a unicorn* will get the following constituent structure:[35]

[34] In the interest of presentation, we assume that not only the basic forms of lexemes are of sort *basic*, but also their inflectional forms. In a more realistic grammar inflectional forms should be derived from the basic ones, thus, they should be of sort *derived*. A short consideration should suffice to see that this assumption does not handicap our account.

[35] We abstract here from word order.

(9.85)



As far as quantifier flow is concerned, the following takes place. The only quantifier in the sentence is generated in the NP *a unicorn*. The *basic* object corresponding to *saw* has two (selected) arguments: *Kim* and *a unicorn*, thus, in order to satisfy Desc_{12} in (9.71) (see constraint (9.70)), it must either retrieve the quantifier or put it in QSTORE. This corresponds to the following values of *psoa* $\boxed{6}$:

(9.86) a. $\boxed{6} = \begin{bmatrix} \textit{psoa} & \\ \text{QSTORE} & \{\} \\ \text{QUANTS} & \langle \boxed{10} \rangle \\ \text{NUCL} & \begin{bmatrix} \textit{see} & \\ \text{SEER} & \boxed{7} \\ \text{SEEN} & \boxed{8} \end{bmatrix} \end{bmatrix}$

b. $\boxed{6} = \begin{bmatrix} \textit{psoa} & \\ \text{QSTORE} & \{\boxed{10}\} \\ \text{QUANTS} & \langle\rangle \\ \text{NUCL} & \begin{bmatrix} \textit{see} & \\ \text{SEER} & \boxed{7} \\ \text{SEEN} & \boxed{8} \end{bmatrix} \end{bmatrix}$

$\boxed{6}$ is, together with the whole *synsem* $\boxed{4}$, the selected argument of the adverb *almost*. This adverb, being a subsort of *word*, must satisfy (9.70). Since it is non-vacuous, it must satisfy

Desc_{12}, i.e., split the quantifiers from its arguments (in this case, at most one quantifier: $\boxed{10}$) between its QUANTS and its QSTORE. In case the quantifier were already retrieved at *see* (cf. (9.86a)), the values of both attributes are empty. In case it were not retrieved at *see* (cf. (9.86b)), the quantifier $\boxed{10}$ goes either to QUANTS or to QSTORE. This gives rise to the following three possible values of *psoa* $\boxed{5}$.

(9.87) $$\boxed{5} = \begin{bmatrix} \textit{psoa} \\ \text{QSTORE} \ \{\} \\ \text{QUANTS} \ \langle\rangle \\ \text{NUCL} \begin{bmatrix} \textit{almost} \\ \text{ARG} \ \boxed{6} \begin{bmatrix} \textit{psoa} \\ \text{QSTORE} \ \{\} \\ \text{QUANTS} \ \langle\boxed{10}\rangle \\ \text{NUCL} \ \textit{see} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

(9.88) $$\boxed{5} = \begin{bmatrix} \textit{psoa} \\ \text{QSTORE} \ \{\} \\ \text{QUANTS} \ \langle\boxed{10}\rangle \\ \text{NUCL} \begin{bmatrix} \textit{almost} \\ \text{ARG} \ \boxed{6} \begin{bmatrix} \textit{psoa} \\ \text{QSTORE} \ \{\boxed{10}\} \\ \text{QUANTS} \ \langle\rangle \\ \text{NUCL} \ \textit{see} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

(9.89) $$\boxed{5} = \begin{bmatrix} \textit{psoa} \\ \text{QSTORE} \ \{\boxed{10}\} \\ \text{QUANTS} \ \langle\rangle \\ \text{NUCL} \begin{bmatrix} \textit{almost} \\ \text{ARG} \ \boxed{6} \begin{bmatrix} \textit{psoa} \\ \text{QSTORE} \ \{\boxed{10}\} \\ \text{QUANTS} \ \langle\rangle \\ \text{NUCL} \ \textit{see} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

Note that $\boxed{5}$ is also the CONTENT value of the Adverbial Phrase (via Semantics Principle) and of the *adj-deriv* verb *saw* (according to the constraint on *adj-deriv* in (9.49) on p.364). From there it percolates (via Semantics Principle again) to VP and S. Assuming a constraint on root clauses to the effect that their QSTORE be empty, we are left with (9.87) and (9.88) as the possible values of $\boxed{5}$. They correspond to the two readings of *Kim almost saw a unicorn.* The analysis of examples such as *Kim apparently almost saw two unicorns* proceeds along the same lines.

Another thing to note is that the constraint (9.70) (repeated below) applies to *word* objects, i.e., to *basic* as well as *derived*. For example, it must be satisfied by the *adj-deriv* verb *saw*.

(9.70) $\textit{word} \rightarrow \text{Desc}_{12} \vee \text{Desc}_3$

As it happens, (9.70) is trivially satisfied by all *adj-deriv* objects, as they are semantically vacuous words and, hence, satisfy Desc_3. However, the analysis of *Kim almost saw a unicorn* would be the same if quantification were modelled via an analogous constraint on *basic* (as in (9.90) below) rather than on *word* (as in (9.70)). On what basis can we choose between these alternatives? Garden variety lexical rules (which might be formalized as subsorts of *derived*) do not provide an answer: passive lexical rule, as well as (most) inflectional lexical rules simply equate CONTENT values of the input and the output. Since these lexical rules do not change the arguments (although they might rearrange them, as the passive lexical rule does), it can be seen that the outputs satisfy the right-hand side of (9.70) if and only if the inputs do. Thus, it does not matter whether the constraint holds of *basic* objects only, or of both *basic* and *derived*.

It seems, however, that there are lexical rules which require changing (9.70) to:

(9.90) $\textit{basic} \rightarrow \text{Desc}_{12} \vee \text{Desc}_{3}$

Such lexical rules are considered in Manning *et al.* (1997) (lexical types, on their approach) and they are used to derive complex predicates (e.g., causatives) out of verbal stems. Assimilating their analysis to our approach, complex predicate lexical rules might be represented as another subsort of *derived*:

(9.91)

$$\begin{bmatrix} \textit{derived} \\ \text{STEM } \textit{word} \end{bmatrix}$$

$$\begin{bmatrix} \textit{0-deriv} \\ \text{PHON } \boxed{0} \\ \text{STEM}|\text{PHON } \boxed{0} \end{bmatrix} \qquad \ldots \qquad \begin{bmatrix} \textit{complex-pred} \\ \text{ARG-ST } \langle \boxed{1},\boxed{2} \rangle \oplus \boxed{3} \\ \ldots\text{CONT}|\text{NUCL } \begin{bmatrix} \textit{complx-prd-rel} \\ \text{ARG } \boxed{4} \end{bmatrix} \\ \text{STEM } \begin{bmatrix} \text{ARG-ST } \boxed{3} \\ \ldots\text{CONT } \boxed{4} \end{bmatrix} \end{bmatrix}$$

What is crucial in *complex-pred* objects is that they introduce their own *psoa*, which might be the locus of quantifier retrieval. Now if constraint (9.70) were to apply both to the STEM value and to the whole *complex-pred* object, nothing would prevent quantifiers in the selected arguments of $\boxed{3}$ from being retrieved twice.[36] The way out which we will adopt here is to assume the constraint (9.90) instead and have a specialized constraint (similar to that of Manning *et al.* (1997)) for *complex-pred* sketched below:[37]

(9.92)

$$\textit{complex-prd} \rightarrow \begin{bmatrix} \text{SS}|\text{LOC} \begin{bmatrix} \text{CONT} \begin{bmatrix} \textit{psoa} \\ \text{QSTORE } \boxed{4} \\ \text{QUANTS } \boxed{5} \end{bmatrix} \\ \text{CAT}|\text{ARG-ST } \langle \boxed{1}[\text{QS } \boxed{11}], \boxed{2}[\text{QS } \boxed{22}] \rangle \oplus \textit{list} \end{bmatrix} \\ \text{STEM}\ldots\text{QSTORE } \boxed{3} \end{bmatrix}$$

where $\boxed{6}$ = the set of elements of $\boxed{5}$,
$\boxed{4} \uplus \boxed{6} = \boxed{11} \uplus \boxed{22} \uplus \boxed{3}$.

Finally, we would like to compare the analysis above to that suggested by Manning *et al.* (1997). As far as similarities are concerned, both analyses rely only on lexical retrieval of

[36] Actually, as observed by Tilman Höhle (p.c.), the standard Quantifier Binding Condition of Pollard and Sag (1994, p.327) might, at least under some formalizations, prevent this multiple retrieval. However, we do not want to rely on this accident.

[37] We might also specify NEW-QS as appropriate to *basic* words only.

quantifiers and both get rid of the RETRIEVED and POOL attributes. Both are also formalized via a "lexical type hierarchy," although in our approach this is understood as ordinary sort hierarchy under *word*.

From one point of view, the analysis presented above can be seen simply as extension and further formalization of suggestions made by Manning *et al.* (1997). However, at least two improvements should also be noted:

- our analysis naturally avoids spurious ambiguities, also in the context of semantically vacuous verbs; the analysis of Manning *et al.* (1997) needs to add additional constraints to this extent (see their fn.28);
- we do not have to assume any additional constraints to ensure proper treatment of adjunct-quantifier scope ambiguities; as things stand, the analysis of Manning *et al.* (1997) wrongly allows multiple retrieval (although see their fn.29).

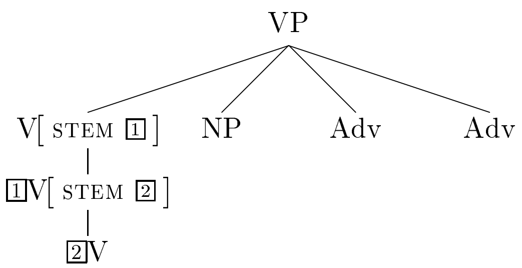
In summary, we have shown that the quantification analysis developed in §9.3.2 and argued to improve in several ways over Pollard and Yoo (1998) properly interacts with the formalization of the 'Adjuncts-as-Complements' approach presented in §9.2.2 (conceptually based on Manning *et al.* (1997)). No additional assumptions were needed. The only modification of the analysis of quantification that may be necessary is minimal: changing the description (9.70) from constraining *word* objects to constraining *basic* objects (9.90).

In the next subsection, we present an alternative formalization of the 'Adjuncts-as-Complements' approach, i.e., via Meta-level Lexical Rule, and show that the analysis of quantification of §9.3.2 can easily be reconciled with it.

9.3.3.3 MLRs Formalization

The biggest conceptual problem with Description-level Lexical Rules, hence also with the account of 'Adjuncts-as-Complements' above, is that derived words carry with them the history of their derivation (in STEM, which might be of sort *deriv* and, thus, contain another STEM, etc.). This problem is noted by, among others, Calcagno and Kasper (1997), who say that in trees such as (9.93) below (corresponding to a VP with two adjuncts) "[t]he correspondence between signs and overt forms is thus much less direct when adjuncts are added by lexical rule than when adjuncts are functors."

(9.93)



As noted above, this problem does not arise in the Meta-level approach to lexical rules, so it is desirable to show that our theory of quantification can be reconciled with the 'Adjuncts-as-

Complements' approach formalized via MLRs.[38]

In what follows, we will first state our assumptions and slightly reformulate the analysis of quantification of §9.3.2, present the lexical rule adding adjuncts to ARG-ST, and then illustrate it with an example.

Assumptions We implicitly assumed above that NEW-QS is appropriate for *word* objects, i.e., that it is a 'root level attribute'. This was the simplest way of enforcing the assumption that NEW-QS can be found only in *word* signs, not in phrases. Nothing hinged on this choice and NEW-QS could be as well made appropriate to, e.g., *category*, just as ARG-ST which, although often assumed to be present on *word*s only, it is usually taken to be also a *category*-level attribute.[39]

In this case, however, it must be ensured that NEW-QS appears only on **lexical** *category* objects. For the present purposes, we assume that *category* has two subsorts:

(9.94)

$$\begin{bmatrix} \textit{category} \\ \text{HEAD } \textit{head} \\ \text{ARG-ST } \textit{list(synsem)} \\ \text{VALENCE } \textit{valence} \end{bmatrix}$$

$$\begin{bmatrix} \textit{word-category} \\ \text{NEW-QS } \textit{set(quant)} \end{bmatrix} \qquad \textit{phrase-category}$$

Moreover, we have to ensure that *word* objects have CATEGORY of sort *word-cat*, while *phrase* objects have CATEGORY of sort *phrase-cat*. Two roughly equivalent ways of doing that are sketched in Przepiórkowski and Kupść (1997a, pp.47–48). Whichever way is chosen, the net effect is that it is possible to distinguish *word-synsem*s (their LOC|CAT is of sort *word-cat*) from *phrase-synsem*s (their LOC|CAT is of sort *phrase-cat*). With this distinction in place, we reformulate the constraint (9.70) as a constraint on *word-synsem*:[40]

(9.95) $\textit{word-synsem} \rightarrow \mathrm{Desc}_{12} \vee \mathrm{Desc}_3$

Adjuncts as Complements with MLRs With these (minimal) changes to our analysis of quantification, we are in position to formulate the meta-level adjunct-addition lexical rule.

(9.96)
$$\begin{bmatrix} \textit{word} \\ \text{SS } \boxed{2}\big[\ldots \text{ARG-ST } \boxed{1}\big] \end{bmatrix} \Rightarrow \begin{bmatrix} \textit{word} \\ \text{SS } \begin{bmatrix} \ldots \text{CONT } \boxed{3} \\ \ldots \text{ARG-ST } \boxed{1} \oplus \boxed{5}\Big\langle \text{XP}\begin{bmatrix} \ldots \text{MOD } \boxed{2} \\ \ldots \text{CONT } \boxed{3} \end{bmatrix} \Big\rangle \end{bmatrix} \end{bmatrix}$$

[38]Since we are unaware of any formalization of MLRs (although see Calcagno (1995)), this section will have a somewhat stipulative flavour: the assumptions about workings of MLRs we make are consistent with, if not subsumed by, those made in the HPSG literature, so any formalization of MLRs should be consistent with the account of this section.

[39]This is made clear, e.g., in Miller and Sag (1997) and Abeillé *et al.* (1998b).

[40]Of course, Desc_{12} and Desc_3 have to be trivially changed in order to hold of *synsem* (rather than *sign*) objects.

Calcagno and Kasper (1997) claim that "if adverbs are added as complements to the verb by a lexical rule such as [(9.96)], then even lexical retrieval will only produce the interpretation [(9.82c)], because the semantic content of the lexical sign derived for the verb will encode a complex predicate including the contribution of the adverbs." We will refute this claim by considering a simple example *Kim saw a unicorn again.*

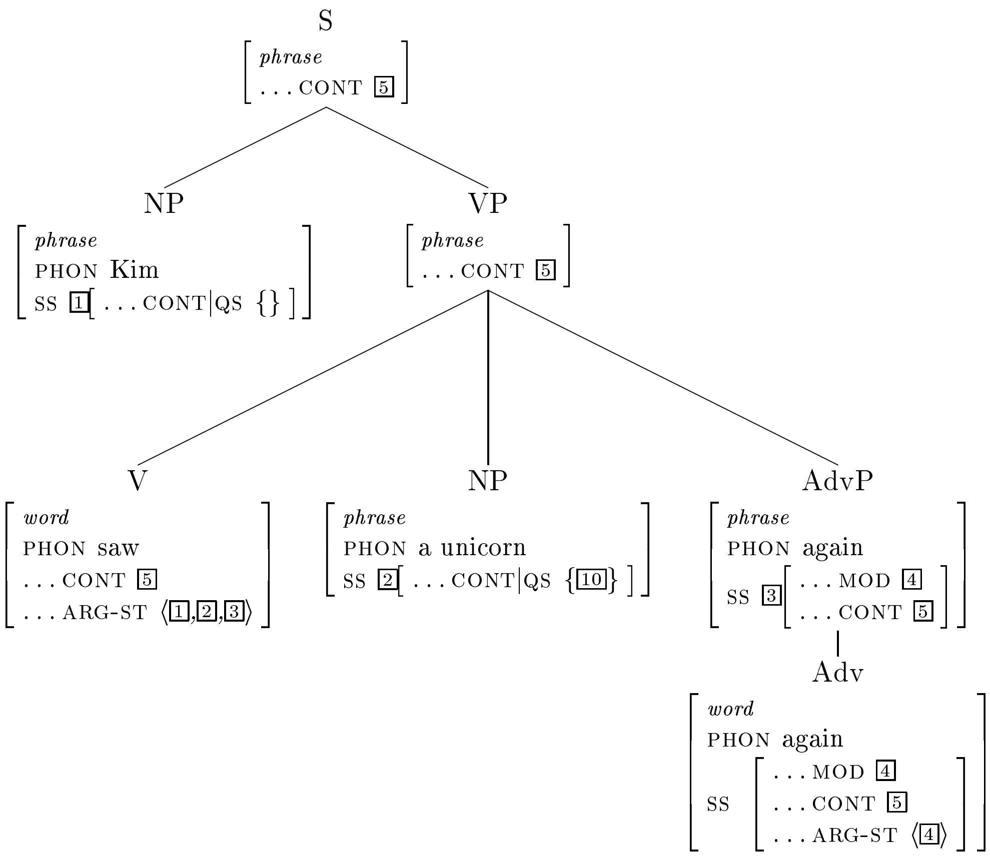
Kim saw a unicorn again. The lexical rule (9.96), when applied to the lexical entry for *saw* (9.97) will produce the entry (9.98).

(9.97)
$$
\left[\begin{array}{l}
\textit{word} \\
\text{PHON saw} \\
\text{SYNSEM } \boxed{4}\left[\begin{array}{l}
\textit{word-synsem} \\
\text{LOC}\left[\begin{array}{l}
\text{CAT}\left[\begin{array}{l}\text{ARG-ST } \langle \boxed{1}_{\boxed{7}}, \boxed{2}_{\boxed{8}} \rangle \\ \text{NEW-QS } \{\}\end{array}\right] \\
\text{CONT}\left[\begin{array}{l}\textit{psoa} \\ \text{NUCL}\left[\begin{array}{l}\textit{see} \\ \text{SEER } \boxed{7} \\ \text{SEEN } \boxed{8}\end{array}\right]\end{array}\right]
\end{array}\right]
\end{array}\right]
\end{array}\right]
$$

(9.98)
$$
\left[\begin{array}{l}
\textit{word} \\
\text{PHON saw} \\
\text{SYNSEM}\left[\begin{array}{l}
\textit{word-synsem} \\
\text{LOC}\left[\begin{array}{l}
\text{CAT}\left[\begin{array}{l}\text{ARG-ST } \left\langle \boxed{1}_{\boxed{7}}, \boxed{2}_{\boxed{8}}, \boxed{3}\text{XP}\left[\begin{array}{l}\ldots\text{MOD } \boxed{4} \\ \ldots\text{CONT } \boxed{5}\end{array}\right] \right\rangle \\ \text{NEW-QS } \{\}\end{array}\right] \\
\text{CONT } \boxed{5}
\end{array}\right]
\end{array}\right]
\end{array}\right]
$$

Note that the output lexical entry (9.98) contains as its proper subpart the SYNSEM part (represented as $\boxed{4}$) of the input lexical entry (9.97). Note also that the SYNSEM value of any object corresponding to the output entry will trivially satisfy (9.95) by satisfying Desc_3. As far as the rest of the analysis is concerned, consider the constituent structure corresponding to *Kim saw a unicorn again.*

(9.99)



This tree should be compared with the tree (9.85) on p.381 resulting from the DLRs analysis. The crucial difference is that in (9.85) we relied on the presence of the embedded *basic* verb *saw* to get the narrow scope of the quantifier. No such embedded verb is available in (9.99). However, according to the lexical rule (9.96), the MOD value of the adjunct ($\boxed{4}$) must satisfy the description of the SYNSEM value in the input entry (9.97). This means that this MOD value must be an object of sort *word-synsem* (minimally, because NEW-QS is present on its CATEGORY value) and, hence, must satisfy constraint (9.95). Since this is not a semantically vacuous *synsem*, this can be done only by satisfying Desc_{12}. As there is only one quantifier ($\boxed{10}$) that is introduced by the selected arguments, this leads to two possible values of LOC|CONT of $\boxed{4}$: the same as in (9.86) on p.381. The rest of the analysis proceeds exactly as in the DLRs account, giving rise to both readings of *Kim saw a unicorn again*:[41]

(9.100) $$\boxed{5} = \begin{bmatrix} \textit{psoa} & \\ \text{QSTORE} & \{\} \\ \text{QUANTS} & \langle\rangle \\ \text{NUCL} & \begin{bmatrix} \textit{again} & \\ \text{ARG} & \boxed{6}\begin{bmatrix} \textit{psoa} & \\ \text{QSTORE} & \{\} \\ \text{QUANTS} & \langle\boxed{10}\rangle \\ \text{NUCL} & \textit{see} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

[41] As well as the reading with an unretrieved quantifier.

(9.101) $$\boxed{5} = \begin{bmatrix} psoa \\ \text{QSTORE } \{\} \\ \text{QUANTS } \langle \boxed{10} \rangle \\ \text{NUCL} \begin{bmatrix} again \\ \text{ARG } \boxed{6} \begin{bmatrix} psoa \\ \text{QSTORE } \{\boxed{10}\} \\ \text{QUANTS } \langle\rangle \\ \text{NUCL } see \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

9.4 Conclusions

In this highly theoretical Chapter, we examined a number of HPSG analyses of the 'Adjuncts-as-Complements' approach, upon which at least some adjuncts should not be configurationally distinguishable from complements. We chose the analysis of Manning *et al.* (1997) as the conceptual basis of our formalization, and we implemented it using the so-called Description-level Lexical Rules; cf. (9.47)–(9.49) on p.363. We showed that this formalization, unlike, e.g., that of Bouma *et al.* (1999b), is immediately compatible with McConnell-Ginet's (1982) analysis of passive-sensitive adverbs, also assuming the 'Adjuncts-as-Complements' approach to modification, and we discussed other features of this formalization, including some conceptual problems.

Then, we devoted a section to answering the criticism that the 'Adjuncts-as-Complements' approach cannot correctly deal with scope ambiguities involving quantifiers and scope-taking adjuncts. To this end, we developed an HPSG theory of quantification, based on Manning *et al.* (1997) and, especially, Pollard and Yoo (1998), but improving on these analyses in many respects, and we showed that this analysis correctly interacts with our formalization of 'Adjuncts-as-Complements', as well as with a possible formalization of 'Adjuncts-as-Complements' in terms of MLRs.

With this linguistically and technically sound analysis of 'Adjuncts-as-Complements', we now move to the fascinating territory of case assignment to adjuncts.

Chapter 10

Case Assignment and Adjuncts

In this last contentful Chapter of our study, we will investigate the rôle of the complement/adjunct dichotomy in grammatical case assignment. First, in §10.1 we will see that there are case assignment processes in a variety of languages which are blind to the complement/adjunct distinction. In particular, we will argue that the Finnish case assignment data, first discussed by Maling (1993), provide a strong argument for adopting the 'Adjuncts-as-Complements' approach to modification.[1] Then, in §10.2, we will see that, contrary to first appearances, also Polish case assignment is insensitive to the dichotomy at hand. In the process, we will minimally extend our analysis of structural case assignment in Polish, developed in Chapter 5, and make certain parts of it more explicit.

10.1 Case Assignment: An Argument for 'Adjuncts-as-Complements'

There is an increasing body of literature showing that, contrary to the common assumption, adjuncts are subject to the same case assignment rules as complements. More specifically, measure, duration and (some) frequency adverbials, collectively called 'extensive measure adverbials' by Wechsler and Lee (1996), receive syntactic case and undergo the same syntactic case variations as complements in languages as different as Russian (Babby, 1980b; Fowler, 1987), Chinese (Li, 1985, 1990), Korean (Maling, 1989; Kim and Maling, 1993, 1996; Wechsler and Lee, 1996), and Finnish (Maling, 1993).[2] In the three subsections below, we will first briefly look at some Russian and Korean data (§§10.1.1–10.1.2), and then, a little more carefully, at Finnish (§10.1.3).

10.1.1 Russian Genitive of Negation

Russian Genitive of Negation is a phenomenon superficially similar to Polish Genitive of Negation (GoN) discussed in §5.2. However, there are important differences: in Russian,

[1] Section 10.1 is based on Przepiórkowski (1997a, 1999b).
[2] Maling (1993) mentions also Warumungu (Simpson, 1991) and Classical Arabic.

but not in Polish, certain (nominative) subjects may under certain circumstances undergo GoN, while, on the other hand, accusative objects undergo GoN only when various additional conditions are met, also unlike in Polish.[3] This gives the impression that Russian GoN in 'optional', in contradistinction to the 'obligatory' nature of the Polish GoN, although this 'optionality' view has been challenged (Bailyn, 1997).

What is important for us is that Russian GoN seems to affect not only subjects and objects, but also the normally accusative adjuncts. Two examples of negated sentences involving genitive NP adverbials (in place of accusative NP adverbials in non-negated sentences) are given below (after Babby (1980a, p.85)).

(10.1) ...lučšie umy čelovečestva nočej ne spali...
best$_{nom}$ minds$_{nom}$ mankind$_{gen}$ nights$_{gen}$ NM slept
'...mankind's best minds did not sleep nights...'

(10.2) Ja s takoj baboj dnja ne stal by žit'.
I$_{nom}$ with such woman day$_{gen}$ NM begin $_{subj}$ live$_{inf}$
'I couldn't live with a woman like that for (even) a day.'

Although such cases of GoN on adverbials seem much rarer than those involving objects, this seems to "follow from the scope of negation: durations exist independent of a negated verb, so it is rather a marked sentence that pulls them inside the scope of negation" (Fowler, 1987, p.308). Thus, it seems that case assignment rules responsible for Russian GoN do not distinguish between complements and adjuncts; "the only reason that subjects, direct objects, and time adverb[ial]s are marked genitive is that they do not happen to be marked by an oblique [i.e., inherent; A.P.] case" (Babby, 1980a, p.86).

In §10.2.2 below we will discuss the Genitive of Negation on adjuncts in Polish and see that the relevant Polish facts differ from Russian GoN in interesting ways.

10.1.2 Korean Accusative/Nominative Alternation

As extensively discussed in Maling (1989) and Kim and Maling (1993, 1996), in Korean, "adverbials are indeed assigned case syntactically, just like verbal arguments" (Kim and Maling, 1996). One example of this parallel behaviour of complements and adjuncts comes from syntactic passivization: roughly, although in active sentences objects and frequency adverbials must occur in the accusative case, in the so-called *ci*-passive, they must both bear the nominative case (Kim and Maling, 1996):

(10.3) Chelsoo-ka i chayk-ul sey pen-ul / *pen-i ilk-ess-ta.
Chelsoo-Nom this book-Acc three times-Acc / times-Nom read-Pst-Ind
'Chelsoo read this book three times.'

(10.4) I hcayk-i sey pen-i / *pen-ul ilk-hi-eci-ess-ta.
this book-Nom three times-Nom / times-Acc read-Pass-Pass-Pst-Ind

[3]Various factors influencing the Russian GoN are extensively discussed in Timberlake (1975, 1986); see also Klenin (1978), Babby (1980a), Neidle (1982, 1988), Fowler (1987), Bailyn (1997), Brown (1996, 1999).

‘This book was read three times.’

This kind of “parallelism suggests that Case Theory does not draw a distinction between arguments and non-arguments” (Maling, 1989, p.305).

Also Wechsler and Lee (1996) extensively argue that “case is assigned to [a class of Korean] adverbials through the same process which assigns direct case to arguments” (Wechsler and Lee, 1996, p.634). In particular, they reach the following case assignment rule in Korean:

(10.5) Korean Case Rule:

a. Assign ACC to any CASE dependent with an external co-argument;

b. Assign NOM to any CASE dependent lacking an external co-argument.

According to (10.5), all structural dependents of a verb receive either the nominative or the accusative case, depending on the presence or absence of another dependent bearing the role of the subject (external co-argument). Thus, the nominative case is assigned to subjects (because there is no *other* dependent being a subject) and to all dependents of verbs lacking a subject.

This elegantly explains the passive data (10.3)–(10.4) from Kim and Maling (1996) and (10.6) from Wechsler and Lee (1996), as well as the contrast (10.7a)–(10.7b), also from Wechsler and Lee (1996), on the assumption that the verb *philyoha-ta* ‘need-Dec’ does not take an external argument.

(10.6) a.

Swuni-ka	cip-ul	pheyinthu-lul	twu pen-ul	chilhay-ess-ta.
Swuni-Nom	house-Acc	paint-Acc	twice-Acc	brush-Pst-Dec

‘Swuni painted the house twice.’

b.

Cip-i	Swuni-eyuhay	pheyinthu-ka	twu pen-i	chilhay-ci-ess-ta.
house-Nom	Swumi-by	paint-Nom	twice-Nom	brush-Pass-Pst-Dec

‘The house was painted twice by Swuni.’

(10.7) a.

Tom-i	twu	sikan-tongan-ul	tali-ess-ta.	
Tom-Nom	two	hours-period-Acc	run-Pst-Dec	

‘Tom ran for two hours.’

b.

Ku-ka	cha-ka	sey	sikan-i	philyoha-ta.
he-Nom	car-Nom	three	hour-Nom	need-Dec

‘He needs a car for three hours.’

Thus, Korean is another language in which case assignment rules do not distinguish between complements and adjuncts.

Below, we will take a close look at similar data from Finnish.

10.1.3 Finnish Nominative and Accusative

10.1.3.1 Generalizations

Finnish is famous for its rich case system involving 15 different morphological cases.[4] As in many other languages, these are divided into syntactic cases (e.g., nominative, accusative, partitive) and lexical cases (e.g., genitive and illative). Roughly, a given predicate may subcategorize either for a structural case (resolved syntactically), or for a given lexical case. A verb's dependents which are not marked by the verb as bearing a lexical case receive either nominative or accusative.[5]

Maling (1993) argues at length that some adjuncts (adverbials of measure, duration and frequency) behave just like objects with respect to case assignment and, in particular, notes the following generalization about syntactic case assignment: only one NP dependent of the verb receives the nominative, namely the one which has the highest grammatical function; other dependents receive the accusative.[6] Thus, if none of the arguments bears inherent case, the subject is in the nominative and other dependents are in the accusative (10.8), but if the subject bears an idiosyncratic case, it is the object that gets the nominative (10.9). Furthermore, if all arguments (if any) bear inherent case, the next 'available' grammatical function is that of an adjunct, thus one of the adjuncts receives the nominative (10.10)–(10.11).

(10.8) Liisa muisti matkan vuoden.
Liisa$_{nom}$ remembered trip$_{acc}$ year$_{acc}$
'Liisa remembered the trip for a year.'

(10.9) Lapsen täytyy lukea kirja kolmannen kerran.
child$_{gen}$ must read book$_{nom}$ [third time]$_{acc}$
'The child must read the book for a 3rd time.'

(10.10) Kekkoseen luotettiin yksi kerta.
Kekkonen$_{ill}$ trust$_{passp}$ [one time]$_{nom}$
'Kekkonen was trusted once.'

(10.11) Kekkoseen luotettiin yhden kerran yksi vuosi.
Kekkonen$_{ill}$ trust$_{passp}$ [one time]$_{acc}$ [one year]$_{nom}$
'Kekkonen was trusted for one year once.'

On the basis of facts such as (10.8)–(10.11), Maling (1993) concludes that syntactic case is assigned on the basis of grammatical hierarchy and that (at least some) adjuncts belong to this hierarchy. Moreover, as evidenced by (10.10)–(10.11), adjuncts do not form a single class

[4]In a sense, Finnish case system is almost as complex as a case system can be: languages with more cases have just richer inventory of locative cases (of which Finnish has 9); cf. Blake (1994, ch.5).

[5]We simplify here in ignoring semantic case assignment, e.g., in true locative uses of locative cases, and the partitive, which has been described as a 'semantically conditioned structural case' (Kiparsky, 1998, p.265).

[6]See also Zaenen and Maling (1983) and Zaenen *et al.* (1985), briefly discussed in §3.3, for a similar generalization with respect to Icelandic.

in this hierarchy: although the multiplicative adverbial[7] *yksi kerta* is nominative in (10.10), this case is won over by the duration adverbial in (10.11). Taking into consideration also the partitive of negation facts (measure adverbials, but not duration or frequency adverbials, behave like direct objects in the sense that they take partitive case under sentential negation), Maling (1993) extends the grammatical function hierarchy for Finnish in the following way:

(10.12) SUBJ > OBJ > MEASURE > DURATION > FREQUENCY

It should be clear by now that the Finnish case assignment facts can easily be modelled in our approach to case assignment and modification: provided that the relevant adverbials are present on ARG-ST, the nominative is simply assigned to the first structural NP on ARG-ST, the accusative to any following structural NP. Thus, the facts discussed above provide evidence both for the non-configurational approach to case assignment developed in the previous Part of this study, and for the 'Adjuncts-as-Complements' approach to modification in which (at least some) adjuncts are present on ARG-ST (or on DEPS, assuming the formalization of Bouma *et al.* (1999b)). In the following subsection we make a much stronger claim, namely that all other combinations of approaches to case assignment and modification currently available on the HPSG market can deal with these facts only at a very prohibitive cost.

10.1.3.2 Evidence for 'Adjuncts-as-Complements'

Modification as in Pollard and Sag (1994) Let us consider first the standard (Pollard and Sag, 1994) approach to adjuncts and recall that adjuncts are supposed to modify phrases, i.e., they select (via MOD) *synsem*s with empty COMPS (see §6.5.2 above).[8]

Case Assignment as in Pollard and Sag (1994) Assuming the minimalist approach to case of Pollard and Sag (1994) (cf. §3.4), bare NP adverbials would have to originate in the lexicon with their case specified, thus there would be two lexical entries for each adverbial taking part in the alternations exemplified in (10.8)–(10.11): one in the nominative, and another in the accusative. Let us consider what the MOD value of, say, a nominative multiplicative adverbial such as *yksi kerta* 'one time' should be. It can modify only those verbs, which do not have a structural subject or structural object, and which are not modified by a duration adverbial. But there is no way this information can be encoded in the MOD value. Since adjuncts modify phrases, the COMPS value of the MOD synsem is an empty list, so the adjunct has no information about whether there is a structural complement on this verb or not. Even worse, the adjunct has no information about other adjuncts, which might win over the nominative.

One way of solving this problem would be to let adjuncts 'blindly' modify any phrases, and posit global well-formedness constraints ruling out, say, structures with a nominative multiplicative adverbial whenever there is a structural subject, object or duration adverbial. Such constraints can, in principle, be stated although they would have to be formulated as constraints on maximal projections (to ensure that no more adjuncts are attached), and would

[7]We call adverbials such as *once*, *third time*, etc. 'multiplicative' to distinguish them from other frequency adverbials such as 'every day', which might have different case-taking properties as discussed in Wechsler and Lee (1996).

[8]Our argument is orthogonal to the improvements by Kasper (1997).

be fairly complex. Moreover, the simple empirical generalization that the nominative is assigned to the highest available grammatical function, and the accusative to any other available grammatical function, would be lost without a trace.

Case Assignment as in Heinz and Matiasek (1994) Interestingly, also adopting the configurational case assignment technique of Heinz and Matiasek (1994) and others (see §§3.4.2–3.4.3) does not help. Their approach, although configurational, is local in the sense that their Case Principle operates on local trees: it never traverses the tree. However, in order to model the Finnish data, exactly such a traversal would be necessary. To see why, let us consider again a multiplicative adverbial attaching to a VP. Assuming that such adverbials are specified as *structural* in the lexicon, what would a constraint resolving the case of such a structural adverbial have to look like? There is no information about the head's complements at the level of Head-Adjunct Schema, so this constraint would have to go down along the projection path to the *word* level. This, however, is still not enough as there might be a duration adverbial attaching higher than our multiplicative adverbial. Thus, this constraint would also have to 'look up'. This is technically impossible[9] so, again, the Case Principle would have to be formulated not as a constraint on *phrase*, but rather as a global constraint on maximal projections. This shares all the problems with the standard (Pollard and Sag, 1994) approach to case.

Modification as in Kasper (1994) Let us now consider another approach to modification, namely that of Kasper (1994) (cf. §6.5.3). The main idea of his proposal (based on German *Mittelfeld* facts) is to replace the Head-Complement Schema and the Head-Adjunct Schema with a single schema realizing complements (on COMP-DTRS) as well as adjuncts (on ADJ-DTRS), so that adjuncts modify *word*s, rather than *phrase*s. Adjuncts are ordered on ADJ-DTRS according to scope: the first one has the widest scope, the last one scopes immediately over the predicate. Moreover, all adjuncts syntactically select the head, while semantically — the next adjunct on the ADJ-DTRS (or the head, in case of the last adjunct). Let us again consider in turn the approaches to case assignment of Pollard and Sag (1994), and of Heinz and Matiasek (1994) and others.

Case Assignment as in Pollard and Sag (1994) Assume first the approach to case assignment of Pollard and Sag (1994), i.e., no specialized case module, and consider again the question of what kind of verbs can be modified by a nominative multiplicative adverbial. It is now easy to state part of the necessary condition, namely that there cannot be any structural NPs among the arguments of the word: the MOD value of such an adverbial would have to be a synsem, whose VALENCE features (or ARG-ST) do not contain such NPs. However, it is still impossible for multiplicative adverbials to select heads not modified by durational adverbials. Thus, again, we would have to resort to well-formedness checking principles. However, this time this checking could be stated as a constraint on Head-Complement Schema (assuming that *all* relevant adjuncts are sisters to complements), thus avoiding the problem of global constraints.

[9]Unless one posits a global constraint on, say, unembedded *sign*s, or adopts a logic for HPSG which allows 'inside-out constraints'; cf. Koenig (1999a) for discussion.

Case Assignment as in Heinz and Matiasek (1994) Also assuming the approach of Heinz and Matiasek (1994), the problem of global constraints would be evaded: the Case Principle could operate on Head-Complement phrases. However, this Case Principle would have to be (again) fairly complex: it would have to look into VAL|SUBJ to check if the verbal phrase expects a structural subject, and then into COMP-DTRS and ADJ-DTRS, and calculate cases of all structural dependents with regards to other dependents. For example, in order to assign nominative to a multiplicative adverbial, such a principle would have to make sure that 1) the element of VAL|SUBJ is not an NP[*str*], 2) there are no NP[*str*]s among elements of COMP-DTRS, 3) there are no duration adverbials on ADJ-DTRS.

Although it is an improvement over the standard theory of modification, the approach of Kasper (1994) is not without its problems. First, again, case assignment has to be tree-configurational (although pretty local). Second, and more importantly, the generalization captured by Maling (1993) would be lost again: instead of assigning the nominative to the first structural NP on a certain list and the accusative to all the other structural elements, the Case Principle would have to do quite a lot of calculation. It seems that in order not to miss the generalizations, an additional attribute would have to be introduced whose value would be the concatenation of the subject, the complements and the adjuncts, in this order: then the nominative could be assigned to the first structural NP on this list, etc.[10] What is striking about this solution, however, is that the only purpose of this attribute would be to encode the obliqueness hierarchy among (some of) the dependents of the word, a clear case of unwelcome theoretical redundancy (ARG-ST already fulfills this function with respect to arguments!). Even if these problems were solved, one remaining problem would be more difficult to deal with: the order of adjuncts on ADJ-DTRS assumed by Kasper (1994) (adjuncts of wider scope earlier on the list) is not reconcilable with the grammatical function order postulated by Maling (1993). For example, if both frequency and duration adverbials are present, two different orders on ADJ-DTRS correspond to two different scoping relations between them, wrongly predicting that the case of these adverbials depends on their scope.

Summary What we hope to have shown is that no combination of the existing HPSG accounts of modification (i.e., adjuncts via Head-Adjunct Schema of Pollard and Sag (1994) and adjuncts as sisters to complements by Kasper (1994)) with the existing approaches to case assignment (i.e., strictly lexical by Pollard and Sag (1994) and configurational by Heinz and Matiasek (1994) and others) can elegantly account for the case assignment to adverbials data from Finnish (and, by extension, from other languages). Although, technically, there are ways of saving these accounts, the price to be paid is prohibitive: loss of the linguistic insights and non-negligible complexity of such accounts.[11]

[10] The function of this attribute would be similar to the function of SUBCAT, retained in Pollard and Sag (1994, ch.9) to handle the Binding Theory facts; thus it is not technically necessary but it is very useful for a straightforward and intuitively appealing account.

[11] The other four combinations of modification / case assignment accounts which we reject without discussion are: 1), 2) case assignment on ARG-ST with either of the two non-'Adjuncts-as-Complements' approaches to modification (for the obvious reason that structural case is resolved on ARG-ST, and adverbials, by assumption, never make it to any ARG-ST); and 3), 4) 'Adjuncts-as-Complements' approach to modification with either of the two previous approaches to case assignment (minimally, because they share the case assignment problems discussed in §4.1).

10.2 Case and Adjuncts in Polish

There are two aims this section attempts to achieve: the general one, i.e., to show that various case assignment processes do not distinguish between complements and adjuncts, and the technical one, i.e., to tie various loose ends from Chapter 5, in particular, to extend to adjuncts our analysis of syntactic case assignment in Polish developed there.

Section 10.2.1 is concerned only with the former aim: it provides data suggesting that various instances of so-called semantic case are blind to the complement/adjunct dichotomy. Then, in §10.2.2, we extend our account of Genitive of Negation to adjuncts, refuting the claims that it is fundamentally different from GoN to complements. Finally, in §10.2.3, we show that our analysis of case assignment and predication in §5.4 accounts for the case of non-subcategorized predicates.

10.2.1 Semantic Case

It is difficult to argue that semantic case assignment does not distinguish between complements and adjuncts without first presenting at least a preliminary theory of what semantic case assignment amounts to. Unfortunately, to the best of our knowledge, there is no such a theory around,[12] and developing it would lead us too far away from the syntactic territory. For this reason, the material in this subsection is presented only at an intuitive level.

10.2.1.1 Instrumental of Predication

We have already extensively dealt with one apparent instance of semantic case, i.e., the instrumental case on predicative dependents; cf. §5.1.5 and, especially, §5.4 above. In §10.2.3, we will deal with the technical aspects of extending the analysis presented there to adjuncts; here, we will only recall certain facts which show that the 'instrumental of predication' is assigned to complements and adjuncts alike.

We established in §5.4 that, on the first approximation, instrumental case may be assigned to predicative adjectival phrases which predicate of a *structural* NP, although this option is often blocked by the alternative option of having the full case agreement between the predicate and the predicated phrase. Moreover, we saw that the instrumental case is the only option available when this predicated NP is a PRO. Some examples, involving a subcategorized predicative AP are given in (10.13)–(10.18).

(10.13) ?Janek czuł się pokrzywdzonym.
John$_{nom}$ felt RM wronged$_{ins}$
'John felt wronged.'

(10.14) To uczyniło go bezradnym.
this$_{nom}$ made him$_{acc}$ helpless$_{ins}$
'This made him helpless.'

[12] But see, e.g., Butt and King (1991, 1999) for some initial attempts.

(10.15) ?Uznałem go głupim.
considered$_{1st,sg,masc}$ him$_{acc}$ stupid$_{ins}$
'I considered him stupid.'

(10.16) Być młodym to być głupim.
by$_{inf}$ young$_{ins}$ is be$_{inf}$ stupid$_{ins}$
'To be young is to be stupid.'

(10.17) Tych pięciu facetów okazało się niezdolnymi do tego.
these$_{gen/acc}$ five$_{acc}$ guys$_{gen}$ turned out RM unable$_{ins}$ to this
'These five guys turned out (to be) unable to do that.'

(10.18) Wiele studentek chce wydawać się szczęśliwymi.
many$_{acc}$ students$_{gen,pl,fem}$ want$_{3rd,sg,neut}$ seem$_{inf}$ RM happy$_{ins}$
'Many students$_{fem}$ want to seem happy.'

In all these examples, the instrumental predicative AP is a clear case of a complement: not only is it 'indispensable to complete the meaning of the verb' (cf. the functional criterion (C3) of Chapter 6), but it is actually syntactically obligatory (cf. the syntactic-functional criterion (C3′)) and it cannot iterate (iterability criterion (C4)).

Similarly, also predicative adjunct APs may bear the instrumental case:

(10.19) Pamiętam go bardzo grzecznym.
remember$_{1st,sg}$ him$_{acc}$ very polite$_{ins}$
'I remember him as very polite.'

(10.20) Widziałem go pijanym.
saw$_{1st,sg,masc}$ him$_{acc}$ drunk$_{ins}$
'I saw him drunk.'

(10.21) Zastałem go pijanym.
found$_{1st,sg,masc}$ him$_{acc}$ drunk$_{ins}$
'I found him drunk.'

(10.22) Znam go takim od dawna. (Czapiga, 1994, p.91)
know$_{1st,sg}$ him$_{acc}$ such$_{ins}$ since long
'I've known him like that for a long time.'

(10.23) Widzę / rodzę / budzę go smutnym. (Pisarkowa, 1965, p.21)
see$_{1st,sg}$ / give birth$_{1st,sg}$ / wake up$_{1st,sg}$ him$_{acc}$ sad$_{ins}$
'I see him / give birth to him / wake him up sad.'

(10.24) Przyjść do szkoły / wrócić pijanym to skandal!
come$_{inf}$ to school / come back$_{inf}$ drunk$_{ins}$ is scandal
'To come to school / return drunk is scandalous!'

(10.25)	Kazałem	mu	stać	nagim.
	ordered$_{1st,sg,masc}$	him$_{dat}$	stand$_{inf}$	naked$_{ins}$
	'I asked him to stand naked.'			

In these examples, the instrumental AP is a clear case of an adjunct, at least according to the most popular functional criterion: it is neither syntactically obligatory, nor are these sentences with the AP[*ins*] omitted felt as elliptical.

This means that the 'instrumental of predication' is assigned to complements and adjuncts alike.

10.2.1.2 Instrumental of Means

Dependents bearing the 'instrumental of means' are particularly problematic for the complement/adjunct distinction: according to the functional and syntactic-functional criteria (C3) and (C3′), they should normally be classified as adjuncts (that seems to be the position taken by most linguistic theories), while according to the iterability criterion (C4), they are complements (and, hence, treated as such in LFG).

In Polish, there is at least one clear case of a complement bearing the instrumental of means, i.e., the complement of *posłużyć się* 'use, utilize':

(10.26)	Janek	posłużył	się	*(młotkiem).
	John	used	RM	hammer$_{ins}$
	'John did it with a hammer.'			

As the grammaticality marking in (10.26) shows, this sentence would be unacceptable if the instrumental phrase were absent, so *młotkiem* is here a prototypical complement.

Other cases of instrumental of means are more disputable, although, at least according to the functional and the syntactic-functional criteria, the instrumental phrases below are adjuncts: they can be left out without affecting the grammaticality of the sentence or its non-ellipticity.

(10.27)	Janek	broni	się	mieczem.	
	John	defends	RM	swor$_{ins}$	
	'John defends himself with a sword.'				
(10.28)	Maria	dołożyła	mu	torebką.	
	Mary	hit	him$_{dat}$	bag$_{ins}$	
	'Mary hit him with a bag.'				
(10.29)	Tomek	drażnił	ich	ciągłymi	pytaniami.
	Tom	irritated	them$_{acc}$	constant$_{ins}$	questions$_{ins}$
	'Tom irritated them with constant questions.'				
(10.30)	Malował	grubym	pędzlem.		
	painted$_{3rd,sg,masc}$	thick$_{ins}$	brush$_{ins}$		
	'He painted with a thick brush.'				

Thus, to the extent that the instrumental phrases in (10.27)–(10.30) are adjuncts, the instrumental of means may be assigned to complements and adjuncts alike.[13]

10.2.1.3 Recipient Dative

Wierzbicka (1986, p.386) defines 'the core meaning of dative' as designating the recipient in sentences of giving, and assigns it the following 'semantic structure' (where Y is the dative-bearing element):

(10.31) Core Meaning of Dative (Wierzbicka, 1986, p.386):

X did something with thing Y
wanting person Z to come to have it
something happened to Y because of that
one could assume that Z would come to have Y because of that.

Some examples fitting this 'semantic structure' are given below:[14]

(10.32) Ewa podarowała ?*(Adamowi) jabłko.
Eve$_{nom}$ donated Adam$_{dat}$ apple$_{acc}$
'Eve gave Adam an apple as a gift.'

(10.33) Ewa dała ??(Adamowi) jabłko.
Eva gave Adam$_{dat}$ apple
'Eve gave Adam an apple.'

(10.34) Ewa rzuciła (Adamowi) jabłko.
Eve threw Adam$_{dat}$ apple
'Eve threw Adam an apple.'

(10.35) Ewa kupiła (Adamowi) jabłko.
Eve bought Adam$_{dat}$ apple
'Eve bought Adam an apple.'

(10.36) Ewa wywalczyła (Adamowi) jabłko.
Eve fought/won Adam$_{dat}$ apple
'Eve won Adam an apple.'

What these examples actually show is that, just as in case of the 'instrumental of predication' and the 'instrumental of means', the 'dative of recipient' does not distinguish between complements and adjuncts: while dative phrases in (10.32)–(10.33) are clear cases of complements (these examples are at best elliptical when *Adamowi* is missing), the same phrases

[13] On the other hand, there is a clear *statistical* difference: many more verbs combine with instrumental adjuncts than with instrumental complements. This does not, however, contradict the fact that there exist instrumental complements, such as that in (10.26), with the 'instrumental of means' meaning.

[14] (10.33) is from Wierzbicka (1986, p.387).

in (10.34)–(10.36) are usually identified as adjuncts (removing *Adamowi* does not result in ellipticity).[15]

10.2.1.4 Summary

We have seen that three prototypical cases of 'semantic case', i.e., the instrumental of predication, the instrumental of means and the recipient dative fail to distinguish between complements and adjuncts.

Of course, this does not mean that complements and adjuncts necessarily bear exactly the same range of semantic cases; in fact, there seem to be certain case–meaning correlations which occur only on adjuncts, and not on complements, e.g., the genitive of temporal location, as in (10.37) below.

(10.37) Przyjechał zeszłego lata.
arrived$_{3rd,sg,masc}$ last$_{gen}$ summer$_{gen}$
'He arrived last summer.'

What we do claim, however, is that there are instances of semantic case which do not distinguish between complements and adjuncts. This means that, contrary to common assumptions, complements and adjuncts are subject to the same *kinds* of case assignment mechanisms, although the exact repertoire of semantic cases assigned to different kinds of dependents may vary.

In §10.2.3 below, we will consider the consequences of this fact for our analysis of case assignment in predicative constructions, but first we will examine the apparent differences between complements and adjuncts with respect to the Genitive of Negation (§10.2.2).

10.2.2 Genitive of Negation

It has been claimed that, in Polish, the Genitive of Negation on complements and what seems to be the Genitive on Negation on adjuncts, are two completely different processes (Franks and Dziwirek, 1993). In this section, we refute this claim and show that the opposite is true, i.e., that Genitive of Negation does not distinguish complements from adjuncts. This result provides one more argument for the 'Adjuncts-as-Complements' approach to modification argued for in this study.

10.2.2.1 Genitive (of Negation) Adjuncts are Partitive?

In §5.2, we extensively discussed the phenomenon consisting in case shift on a complement of a verb from accusative to genitive when the verb is negated. Nevertheless, there is an aspect of GoN which has received very little attention in the literature and which we also ignored

[15]See also Fried (1999) for a discussion of 'free datives' in Czech and arguments for assimilating (most of) them to complements, and Dąbrowska (1994) for additional instances of semantically-governed case assignment to arguments in Polish.

there: not only objects can undergo this process, but, apparently, also accusative adjuncts.[16] However, as discussed by Franks and Dziwirek (1993) (as well as in Dziwirek (1991, 1994)), there seems to be an important difference: although GoN is obligatory for complements, cf. (10.38), it is optional for adjuncts, cf. (10.39):[17]

(10.38) a. Janek pisze list / *listu.
John writes letter$_{acc}$ / letter$_{gen}$
'John is writing a letter.'

b. Janek nie pisze listu / *list.
John NM writes letter$_{gen}$ / letter$_{acc}$
'John is not writing a letter.'

(10.39) a. Rozmawiałem z nim dwie godziny / *dwóch godzin.
talked$_{1st,sg,masc}$ with him two$_{acc}$ hours$_{acc}$ / two$_{gen}$ hours$_{gen}$
'We were talking for two hours.'

b. Nie rozmawiałem z nim dwie godziny / dwóch godzin.
NM talked$_{1st,sg,masc}$ with him two$_{acc}$ hours$_{acc}$ / two$_{gen}$ hours$_{gen}$
'We weren't talking for two hours.'

In order to account for this difference, Franks and Dziwirek (1993, p.289) make two basic claims:

- Genitive complements and genitive adjuncts under negation are two separate constructions.
- Genitive adjuncts under negation are really partitive.

The latter claim is critically examined (and rejected) by Borovikoff (1997). Here, we will refute the first claim; in particular, although we will tentatively agree that there are two separate processes at stake here, we will show that the difference does not correlate with the complement/adjunct dichotomy.

Consider examples (10.40)–(10.42) below, adduced by Franks and Dziwirek (1993, pp.287–288) in support of their claim.

(10.40) a. Bielany leżą milę / *mili od Warszawy.
Bielany$_{nom}$ lie mile$_{acc}$ / mile$_{gen}$ from Warsaw

[16] As briefly discussed in §10.1.1 above, this has also been noted for Russian, e.g., by Babby (1980a) (cf. also Timberlake (1975), Babby (1980b, fn.2), Babby (1986, fn.43), Fowler (1987, pp.307f.)), who claims that in Russian "the only reason that subjects, direct objects, and time adverbs are marked genitive [under negation] is that they do not happen to be marked by an oblique case" (p.86, see also p.150).

[17] Actually, Willim (1990, p.211) and Tajsner (1990, p.246) deny that adjuncts can undergo GoN. On the other hand, Holvoet (1991, p.85) and Franks and Dziwirek (1993) consider such examples grammatical. We are not sure if this is the result of a genuine variation, or whether Willim's and Tajsner's judgements stem from the fact that additional presuppositions are connected with the genitive variant, pace Holvoet (1991, p.85), or that they may have partitive meaning, pace Franks and Dziwirek (1993). In any case, all our informants considered both possibilities fully acceptable.

‘Bielany lies a mile from Warsaw.’

b. Bielany nie leżą milę / mili od Warszawy.
Bielany$_{nom}$ NM lie mile$_{acc}$ / mile$_{gen}$ from Warsaw
‘Bielany doesn’t lie a mile from Warsaw.’

(10.41) a. Ten dom kosztował trzysta / *trzystu tysięcy.
this$_{nom}$ house$_{nom}$ cost 300$_{acc}$ / 300$_{gen}$ thousand
‘This house cost three hundred thousand.’

b. Ten dom nie kosztował trzysta / trzystu tysięcy.
this$_{nom}$ house$_{nom}$ NM cost 300$_{acc}$ / 300$_{gen}$ thousand
‘This house didn’t cost three hundred thousand.’

(10.42) a. Ta ryba waży kilogram / *kilograma.
this$_{nom}$ fish$_{nom}$ weighs kilogram$_{acc}$ / kilogram$_{gen}$
‘This fish weighs a kilogram.’

b. Ta ryba nie waży kilogram / kilograma.
this$_{nom}$ fish$_{nom}$ NM weighs kilogram$_{acc}$ / kilogram$_{gen}$
‘This fish doesn’t weigh a kilogram.’

Franks and Dziwirek (1993) assume, without any discussion, that the relevant distance / measure NPs in (10.40)–(10.42) are adjuncts. However, this assumption, crucial for Franks and Dziwirek’s (1993) reasoning, is blatantly wrong: these distance / measure NPs are clear cases of complements according to all popular criteria for this dichotomy.

First, they are ‘indispensable to complete the meaning of the verb’ (cf. the functional criterion (C3) of Chapter 6); all the examples above are semantically incomplete without those NPs. Second, and perhaps more importantly, those distance / measure NPs are also syntactically obligatory (cf. the syntactic-functional criterion (C3′)); when they are omitted, the relevant sentences become ungrammatical:

(10.43) *Bielany leżą (od Warszawy).
Bielany$_{nom}$ lie from Warsaw

(10.44) *Ten dom kosztował.
this$_{nom}$ house$_{nom}$ cost

(10.45) *Ta ryba waży.
this$_{nom}$ fish$_{nom}$ weighs

Moreover, neither of these ‘adjuncts’ can iterate (cf. the iterability criterion (C4)).

It seems that the intuition behind Franks and Dziwirek’s (1993) classification of these dependents as adjuncts is close to the semantic criterion ((C2) in Chapter 6), which says that ‘complements express the persons or things participating in the process in a special way, whereas adjuncts express the time, the place, the manner, etc. connected with that process’, but even this criterion is not applicable here. The problem is that there are arguments expressing distance or measure which, nevertheless, are subject to GoN obligatorily, like canonical complements, and, also like prototypical objects, undergo passivization:

(10.46) a. W czasie jazdy, przegadał cztery kilometry / *czterech kilometrów.
during journey talked through four$_{acc}$ kilometres$_{acc}$ / four$_{gen}$ kilometres$_{gen}$
'During the journey, he talked through four kilometres.'

b. Nie przegadał *cztery kilometry / czterech kilometrów.
NM talked through four$_{acc}$ kilometres$_{acc}$ / four$_{gen}$ kilometres$_{gen}$
'He didn't talk through four kilometres.'

c. Te cztery kilometry zostały przegadane...
these$_{nom}$ four$_{nom}$ kilometres$_{nom}$ Aux talked through
'These four kilometres were talked through...'

(10.47) a. Spędził w pociągu dwie godziny / *dwóch godzin.
spent in train two$_{acc}$ hours$_{acc}$ / two$_{gen}$ hours$_{gen}$
'He spent two hours in the train.'

b. Nie spędził w pociągu *dwie godziny / dwóch godzin.
NM spent in train two$_{acc}$ hours$_{acc}$ / two$_{gen}$ hours$_{gen}$
'He didn't spend two hours in the train.'

c. Te dwie godziny zostały pożytecznie spędzone.
these$_{nom}$ two$_{nom}$ hours$_{nom}$ Aux usefully spent
'These two hours were spent usefully.'

Thus, there is no sense of the complement/adjunct dichotomy in which the 'extensive measure' NPs (to use Wechsler and Lee's (1996) term) in (10.40)–(10.42) may be classified as adjuncts together with the temporal NP in (10.39).

On the contrary, since the NP *dwie godziny* 'two hours' in (10.39) must be classified as adjunct according to the two almost universally accepted criteria, i.e., the functional criterion (C3) and the syntactic-functional criterion (C3′), and since the distance / measure NPs in (10.40)–(10.42) are equally clear cases of complements (as we have just seen), the rule that assigns Genitive of Negation only optionally to some dependents does not distinguish between complements and adjuncts.

Of course, this leaves unanswered the important question of exactly why some dependents undergo the GoN only optionally. We will look into this issue in §10.2.2.3. But first a brief excursus into nominalization is in order.

10.2.2.2 A Remark on Nominalization

Nominalization facts independently confirm the results of the previous subsection.[18] Just as with GoN, it seems at first blush that nominalization distinguishes NP[*acc*] complements from NP[*acc*] adjuncts: the former obligatorily change their case in this process to genitive, the latter are not perfect either in accusative or in genitive, although the accusative sounds markedly better. The examples below should be compared with (10.38)–(10.39) above.

[18]This and, especially, the ensuing subsection owe much to Fowler and Yadroff's (1993) discussion of referentiality of measure nominals in Russian.

(10.48) pisanie listu / *list
writing letter$_{gen}$ / letter$_{acc}$
'writing a letter'

(10.49) rozmawianie przez telefon ?*dwóch godzin / ?dwie godziny
talking through phone two$_{gen}$ hours$_{gen}$ / two$_{acc}$ hours$_{acc}$
'talking over phone for two hours'

However, again, the parallelism with the complement/adjunct distinction is only apparent. For example, the obligatory complement of the non-agentive *ważyć* 'weigh' (cf. (10.42)) behaves just like prototypical NP[*acc*] adjuncts:[19]

(10.50) ważenie ?*stu pięćdziesięciu / ?sto pięćdziesiąt kilogramów
weighing hundred$_{gen}$ fifty$_{gen}$ / hundred$_{acc}$ fifty$_{acc}$ kilo
'weighing 150 kilo'

This makes the problem of distinguishing the accusative dependents which undergo GoN only optionally from those that undergo it obligatorily even more urgent.

10.2.2.3 Case Assignment and Referentiality

Empirical Generalization If it is not the complement/adjunct dichotomy that is responsible for the Genitive of Negation and nominalization facts above, then what is? The answer seems to be 'referentiality'.[20] In particular, the 'extensive measure' NPs in (10.38) and (10.46)–(10.47), as well as in (10.51)–(10.52) below are referential in a sense in which similar NPs in (10.39) and (10.40)–(10.42) are not.

(10.51) Danusia nie spędziła czterech / *cztery dni w Itace.
Danusia NM spent four$_{gen}$ / four$_{acc}$ days in Ithaca
'Danusia didn't spend four days in Ithaca.'

(10.52) Janek nie przeszedł pięciu / *pięć kilometrów w ciągu godziny.
John NM walked through five$_{gen}$ / five$_{acc}$ kilometers during hour
'John didn't cover five kilometers in one hour.'

There are at least three tests which distinguish referential NPs from non-referential NPs: relative pronominalization, anaphoric reference and modifiability by pronominal determiners.[21]

[19]Example (10.50) with the genitive *stu pięćdziesięciu* is acceptable in its agentive meaning, as in: *Ważenie stu pięćdziesięciu kilogramów mięsa w drobnych kawałkach zajęło mu cały dzień* 'Weighing 150 kilo of finely chopped meat took him whole day.'

[20]See Fowler and Yadroff (1993) for a discussion of the referentiality status of measure NPs in Russian and its importance for passivization. This section has been inspired by this discussion although, as it will become clear presently, we are critical about certain pivotal claims of Fowler and Yadroff (1993).

[21]The first two tests are used in Fowler and Yadroff (1993), who are not, however, concerned with the Genitive of Negation; the last test is new. The contrast based on the first of these tests is also noted by Holvoet (1991, p.89) in the context of the optionality of GoN on some accusative dependents. Unfortunately, Holvoet (1991) does not explicate the connection between the optionality of GoN and referentiality.

We will first apply these tests to the 'extensive measure' adverbials in (10.51)–(10.52), and then to those in (10.40)–(10.42).

Relative pronominalization:

(10.53) ...cztery dni, które Danusia spędziła w Itace...
four days which Danusia spent in Ithaca
'...the four days which Danusia spent in Ithaca...'

(10.54) ...5 kilometrów, które Tomek przeszedł w ciągu 4 godzin...
5 kilometres which Tom covered during 4 hours
'...the 5 kilometres that Tom covered during 4 hours...'

Anaphoric reference:

(10.55) Danusia spędziła cztery dni zwiedzając Itakę, a ja je spędziłem na konferencji.
Danusia spent four days visiting Ithaca and I them spent on conference
'Danusia spent four days visiting Ithaca, and I spent them at a/the conference.'

(10.56) Janek przeszedł 5 kilometrów z Zakopanego na Zawrat w ciągu 3 godzin, a ja je przeszedłem w ciągu 4 godzin.
John covered 5 kilometres from Zakopane on Zawrat during 3 hours and I them covered during 4 hours
'John covered the 5 kilometres from Zakopane to Zawrat in 3 hours, and I covered them in 4 hours.'

Pronominal determiners:

(10.57) Danusia spędziła te cztery dni w Itace.
Danusia spent these four days in Ithaca
'Danusia spent these four days in Ithaca.'

(10.58) Janek przeszedł te 5 kilometrów w ciągu 3 godzin.
John covered these 5 kilometres during 3 hours
'John covered these 5 kilometres during 3 hours.'

As the above examples show, the 'extensive measure' NP complements of *spędzić* 'spend' and *przejść* 'walk through, cover' may be realized by relative pronouns, by personal pronouns, and may be modified by pronominal determiners. The situation is drastically different in case of similar complements of *leżeć* 'lie, be situated', *kosztować* 'cost', and *ważyć* 'weigh'.

Relative pronominalization:

(10.59) *...mila, którą Bielany leżą od Warszawy...
mile which Bielany lies from Warsaw

(10.60) *...trzysta tysięcy, które Tomka kosztował ten dom...
300 thousand which Tom cost this house

(10.61) *...kilogram, który waży ta ryba...
kilogram which weighs this fish

Anaphoric reference:

(10.62) *Bielany leżą milę od Warszawy, a Nowa Huta leży ją od Krakowa.
Bielany lies mile from Warsaw and Nowa Huta lies it from Cracow

(10.63) *Ten dom kosztował trzysta tysięcy, a i tamten je kosztował.
this house cost 300 thousand and also that them cost

(10.64) *Ta ryba waży kilogram, i tamta też go waży.
this fish weighs kilogram and that also it weighs

Pronominal determiners:[22]

(10.65) *Bielany leżą tę milę od Warszawy.
Bielany lies this mile from Warsaw

(10.66) *Ten dom kosztował te trzysta tysięcy.
this house cost these 300 thousand

(10.67) *Ta ryba waży ten kilogram.
this fish weighs this kilogram

The same referentiality contrast is present in our initial examples of obligatory vs. optional GoN; cf. (10.38b)–(10.39b), repeated below.

(10.38b) Janek nie pisze listu / *list.
John NM writes letter$_{gen}$ / letter$_{acc}$
'John is not writing a letter.'

(10.39b) Nie rozmawiałem z nim dwie godziny / dwóch godzin.
NM talked$_{1st,sg,masc}$ with him two$_{acc}$ hours$_{acc}$ / two$_{gen}$ hours$_{gen}$
'We weren't talking for two hours.'

Thus:

(10.68) Janek napisał **ten** list, **który** miał napisać już wczoraj, lecz nie napisał
John wrote this letter which had to write already yesterday but NM wrote
go wtedy.
it then
'John wrote **that** letter **which** he was supposed to write already yesterday, but he didn't (write **it** then).'

[22] These sentences are acceptable on the discourse reading of the relevant pronouns, e.g., (10.65) may mean 'I admit that Bielany lies a mile from Warsaw', but not on the true pronominal determiner reading.

(10.69)	Rozmawiałem	z	nim	*te	dwie	godziny,	***które**	miałem	rozmawiać	z
	talked$_{1st,sg,masc}$	with	him	these	two	hours	which	had	talk	with
	Marią,	a	Maria	rozmawiała	***je**	z	Ewą.			
	Mary	and	Mary	talked	them	with	Eve			

This striking correlation between the optionality of GoN and the (non-)referentiality has not, to the best of our knowledge, been noted in the literature so far (but see fn.21 above).

Fowler and Yadroff (1993) The relevance of referentiality to case assignment and, especially, passivization (in Russian) is extensively discussed by Fowler and Yadroff (1993), who follow Rizzi (1990) (see also §6.3.3) in dividing arguments (i.e., elements assigned a θ-role) into referential and non-referential:

- **arguments**: assigned θ-role, referential; (empirically: pass co-reference tests, passivize, nominalize with genitive);
- **quasi-arguments**: assigned θ-role, non-referential; (pass co-reference, make potential but unacceptable passives, do not nominalize); and
- **non-arguments**: not assigned θ-role by the verb, non-referential; (do not pass co-reference, no conceivable passive, nominalization with accusative, rather than with genitive).

However, in a footnote, Fowler and Yadroff (1993, p.259, fn.12) depart from the set of assumptions of Rizzi (1990) and Cinque (1990) and assume that some adjuncts (i.e., elements without a θ-role from the verb) may be referential.

Unfortunately, although this classification improves upon that of Rizzi (1990) and Cinque (1990) in that it admits the (rather obvious) fact that there are referential adjuncts, there is still a fatal problem with it: as it stands, this classification is internally inconsistent. To see this inconsistency, consider closely *quasi-arguments*. Fowler and Yadroff (1993, pp.259–260) characterize them as [$+\theta$-role] and [$-$referential]. However, a moment later, Fowler and Yadroff (1993, pp.260–261) give the relative pronominalization and the anaphoric reference data similar to those cited above, showing that quasi-arguments, unlike non-arguments, pass both referentiality tests. What is especially problematic for Fowler and Yadroff's (1993) claim that quasi-arguments are non-referential is the result of the anaphoric (co-)reference test, which, also on the GB set of assumptions, is a direct argument for referentiality: "[a] phenomenon that discriminates between referential and nonreferential phrases is *coreference*" (Cinque, 1990, p.8). This means that any attempt at explaining the optional GoN facts in Polish in terms of the classification of dependents into arguments / quasi-arguments / non-arguments as understood by Fowler and Yadroff (1993) would be ill-founded. We therefore maintain our claim that the deciding factor for the optionality of GoN is referentiality, based on the three tests given above and applying to arguments and non-arguments alike.[23]

[23]If referential vs. non-referential elements on one hand and complements and adjuncts on the other are two independent dimensions, the question may arise why there are no adjuncts obligatorily undergoing GoN. Our answer to this is that the class of NP[*acc*] adjuncts is simply too small to observe this behaviour: as discussed in

Semantic Differences It is noted both by Franks and Dziwirek (1993) and by Holvoet (1991) that there is a certain difference in meaning between the accusative and the genitive versions of (10.39b)–(10.42b). Thus, Franks and Dziwirek (1993, p.290) say that "although [the accusative and the genitive versions of (10.39b)] have roughly the same English translations, and both presuppose that the speaker did sleep, they are not synonymous. Sentence [(10.39b) with the accusative *dwie godziny*] means **either** that the speaker did not sleep for more than an hour, or that she slept for a shorter time. Sentence [(10.39b) with the genitive *dwóch godzin*] can **only** mean that the speaker slept for less than an hour." For Franks and Dziwirek (1993), this is an argument that the genitive in such cases is really the partitive genitive.[24]

Franks and Dziwirek (1993, pp.290–291) adduce the following data in support of this claim (the judgements are Franks and Dziwirek's (1993)):[25]

(10.70) Ewa nie kupiła kilograma jabłek, tylko trzy (kilogramy).
Eve NM bought kilo$_{gen}$ apples only three$_{acc}$ kilo
'Eve didn't buy one kilo of apples, but three (kilo).'

(10.71) a. Nie spałem godzinę, tylko dwie (godziny).
NM slept$_{1st,sg,masc}$ hour$_{acc}$ only two$_{acc}$ hours
'I didn't sleep an hour, but two (hours).'

b. *Nie spałem godziny, tylko dwie (godziny).
NM slept$_{1st,sg,masc}$ hour$_{gen}$ only two$_{acc}$ hours
'I didn't sleep an hour, but two (hours).'

Although we agree with Franks and Dziwirek (1993) that there is some grammaticality drop between (10.70) and (10.71b), this is certainly not the difference between fully acceptable and fully unacceptable. Actually, the relative (weak) unacceptability of (10.71b) seems to be the same as the relative badness of (10.72a). However, here the NP *dwie godziny* is referential (as can be checked by applying the three referentiality tests employed above) and, accordingly, only the genitive version is acceptable at all, cf. (10.72b).

(10.72) a. ?Nie przespałem godziny, tylko dwie (godziny).
NM slept through hour$_{gen}$ only two$_{acc}$ hours
'I didn't sleep through an hour, but two (hours).'

b. Nie przespałem godziny / *godzinę.
NM slept through hour$_{gen}$ / hour$_{acc}$
'I didn't sleep through an hour.'

Also Holvoet (1991, p.85), commenting on (10.73), notes that "the construction with the genitive usually presupposes that the subject has been sitting at a certain place for a certain time, which in the speaker's view was shorter than might have been expected... With the accusative there seem to be no presuppositions of the kind mentioned."

Tajsner (1990, pp.314f.), NP[*acc*] adjuncts in Polish are restricted to 'quantified' (i.e., non-referential) extensive measure NPs, although, of course, there are other kinds of adjuncts, which are referential, e.g., ethical dative or instrumental of means.

[24] See Borovikoff (1997) for (convincing) dissent.

[25] Franks and Dziwirek (1993) have *a* and *ale* as comparative elements; we use *tylko* as it sounds more acceptable in our idiolect.

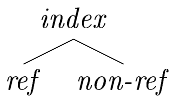
(10.73) a. Piotr nie siedział tam dwie godziny.
Peter NM sat there two$_{acc}$ hours$_{acc}$
'Peter didn't sit there for two hours.'

b. Piotr nie siedział tam dwóch godzin.
Peter NM sat there two$_{gen}$ hours$_{gen}$
'Peter didn't sit there (even) for two hours.'

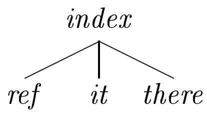
However, Holvoet (1991) immediately adds that "[t]his difference should be stated as a tendency rather than as a rule."

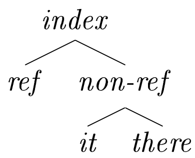
Since the differences in meaning between the accusative and the genitive versions are so subtle and difficult to pinpoint, investigating them in detail here would lead us too far afield. We will be content with formalizing the empirical generalization concerning referentiality and GoN noted above, leaving investigation of deeper reasons why such a generalization should hold at all for future research.

HPSG Formalization We encode the referential vs. non-referential distinction by means of two subtypes of *index*:[26,27]

(10.74)


In fact, this type hierarchy is a generalization of that of Pollard and Sag (1994) for English, cf. (10.75a), which could be made compatible with ours by extending it to (10.75b).

(10.75) a.


b.


Since the class of nouns which may head measure NPs is open,[28] most nouns have their INDEX specified lexically as *index* with particular uses (syntactic positions) of those nouns disambiguating this INDEX value to either *ref* or *non-ref*. Thus, for example, the complements of verbs such as *pisać* 'write' (cf. (10.38) above), *spędzić* 'spend (time)' (cf. (10.47) and (10.51)), *przegadać* 'talk through' (cf. (10.46)) or *przejść* 'walk through' (cf. (10.52)) are

[26]Eventually, non-referential NPs should probably be analysed as bearing no *index* at all. A very promising basis for such an account are the modifications to the HPSG semantics made in Kasper (1997) (especially, §§5–6). We do not develop such an account here because it would be considerably more complicated than that given below, and the matter is not of primary importance for our approach to case assignment and modification.

[27]A different type hierarchy for *index*, based on possibilities of modification by relative clauses involving different relative pronouns is presented in Mykowiecka (1998). Assuming (10.74), her *index* type hierarchy should be placed under *ref*.

[28]For example, *Spałem całą mszę / podróż / lekcję / konferencję...* 'I slept all service (mass) / journey / lesson / conference...'.

specified as *ref*erential, while the complements of *leżeć* 'lie, be situated' (cf. (10.40)), *kosztować* 'cost' (cf. (10.41)), or (non-agentive) *ważyć* 'weigh' (cf. (10.42)) are *non-ref*erential. Also the 'temporal measure' adjuncts, as in (10.39), must be specified as *non-ref*erential.

Given that, and assuming that all pronouns, including relative pronouns, personal pronouns and pronominal determiners, have the *ref*erential INDEX value, which must be identified with the INDEX value of the noun resolving such a pronoun, the referentiality facts (10.53)–(10.67) and (10.68)–(10.69) readily follow.

We are now in the position to modify the clause (5.385) of our CASE PRINCIPLE, responsible for the GoN in Polish (and repeated below).

(5.385) $$\begin{bmatrix} \textit{category} \\ \text{HEAD} \begin{bmatrix} \textit{verb} \\ \text{NEG } + \end{bmatrix} \\ \text{ARG-ST } \boxed{1}_{nelist} \oplus \langle \text{CFC}[\text{CASE } \textit{str}] \rangle \oplus \boxed{2}_{list} \end{bmatrix} \rightarrow \left[\text{ ARG-ST } \boxed{1} \oplus \langle [\text{CASE } \textit{sgen}] \rangle \oplus \boxed{2} \right]$$

The new version will consist of two clauses, one for referential dependents, cf. (10.76), the other for non-referential dependents, cf. (10.77):

(10.76) $$\begin{bmatrix} \textit{category} \\ \text{HEAD} \begin{bmatrix} \textit{verb} \\ \text{NEG } + \end{bmatrix} \\ \text{ARG-ST } \boxed{1}_{nelist} \oplus \langle \text{CFC} \begin{bmatrix} \text{CASE } \textit{str} \\ \text{INDEX } \textit{ref} \end{bmatrix} \rangle \oplus \boxed{2}_{list} \end{bmatrix} \rightarrow \left[\text{ ARG-ST } \boxed{1} \oplus \langle [\text{CASE } \textit{sgen}] \rangle \oplus \boxed{2} \right]$$

(10.77) $$\begin{bmatrix} \textit{category} \\ \text{HEAD} \begin{bmatrix} \textit{verb} \\ \text{NEG } + \end{bmatrix} \\ \text{ARG-ST } \boxed{1}_{nelist} \oplus \langle \text{CFC} \begin{bmatrix} \text{CASE } \textit{str} \\ \text{INDEX } \textit{non-ref} \end{bmatrix} \rangle \oplus \boxed{2}_{list} \end{bmatrix} \rightarrow \left[\text{ ARG-ST } \boxed{1} \oplus \langle [\text{CASE } \textit{sacc} \vee \textit{sgen}] \rangle \oplus \boxed{2} \right]$$

As noted in §10.2.2.2, the *ref*erential vs. *non-ref*erential distinction also plays a rôle in ad-nominal case assignment, but since we do not deal in this study with ad-nominal dependents, we will not analyse the facts considered there.

Summary In this subsection, we argued that the obligatoriness / optionality of GoN does not depend on the complement/adjunct distinction but, instead, it depends on the referentiality of relevant dependents. Although it is not clear to us why this should be so, nor is it clear how exactly the accusative version differs in meaning from the genitive in case of optional GoN, we modified our account of GoN in order to account for these facts, cf. (10.76)–(10.77). Since, on the analysis of the previous Chapter, ARG-ST contains both arguments and adjuncts, our analysis does not make any reference to the (non-)argument status of a dependent.

10.2.3 Predication

In §5.4, devoted to case assignment and predication, we made an implicit assumption that predicative APs (or NPs) which predicate of a verb's argument are themselves present on this verb's ARG-ST, even if they are not semantic arguments of the verb (i.e., even if they are adjuncts). This assumption was necessary in order make the principles developed in Chapter 4 (see, especially, §4.5.1) correctly mark the subject of such predicative phrases as [RAISED +] (on the assumption that these unrealized subjects do indeed share their *synsem*s with the predicated NPs). Only once marked [RAISED +] are such predicative APs (or NPs) exempt from the CASE PRINCIPLE and subject to the PREDICATIVE CASE (NON-)AGREEMENT principle.

In this final subsection, we look more carefully at the implications that the formalization of the 'Adjuncts-as-Complements' approach developed in Chapter 9 has for our account of case assignment and predication of §5.4.

We noted in §5.4 that, contrary to first appearances, instrumental case is not assigned directly to predicative APs (or NPs), but to those case-bearing phrases whose subject is marked as [RAISED +] (abbreviated to XP$^+$). This led to the following principle of 'predicative' case non(-agreement):

(5.468) PREDICATIVE CASE (NON-)AGREEMENT:

$$\begin{bmatrix} \text{VAL}|\text{SUBJ } \langle \text{XP}^+[\text{ HEAD } \boxed{3}[\text{CASE } \boxed{1}]\,] \rangle \\ \text{HEAD}|\text{CASE } \boxed{2} \end{bmatrix} \rightarrow$$
$$\texttt{case-agreement}(\boxed{2},\ \boxed{3}) \vee (\boxed{1} = \textit{str} \wedge \boxed{2} = \textit{lins})$$

where

(5.466) $\texttt{case-agreement}(\boxed{1}\textit{case},\ \boxed{2}\textit{head}) \leftrightarrow (\boxed{2} = [\text{CASE } \boxed{1}] \vee \boxed{2} = \begin{bmatrix} \text{ARG-ST } \langle [\text{CASE } \boxed{1}], \ldots \rangle \\ \text{NUM } + \end{bmatrix})$

Thus, predicative APs (or NPs) are subject to (5.468) only by virtue of the fact that predication usually involves raising to the immediately higher ARG-ST. Two cases which show that predication does not always involve such raising are (5.378)–(5.379) on one hand, and (5.375)–(5.377) on the other, all repeated below.

(5.378) Uważałem$_{1st,sg,masc}$ go za szczerego.
considered him$_{acc}$ for sincere$_{acc}$
'I considered him to be sincere.'

(5.379) Janek wyglądał na szczerego.
John$_{nom}$ looked as sincere$_{acc}$
'John seemed to be sincere.'

(5.375) Maria udaje szczerą.
Mary$_{nom}$ pretends sincere$_{acc}$
'Mary pretends to be sincere.'

(5.376) Maria nie udaje szczerej / *szczerą.
Mary$_{nom}$ NM pretends sincere$_{gen}$ / sincere$_{acc}$
'Mary doesn't pretend to be sincere.'

(5.377) udawanie szczerej
pretend$_{grnd}$ sincere$_{gen}$
'pretending to be sincere'

As discussed in §5.4.1.2, the predicative AP in (5.378)–(5.379) does not lead to a predicative PP; rather, what is happening is that the subject of the predicative AP is raised to the ARG-ST of the verb across the intermediate ARG-ST of the preposition. This means that, since this raised subject is not present on the immediately higher ARG-ST, it is marked as [RAISED −], i.e., it is subject to the CASE PRINCIPLE, rather than the PREDICATIVE CASE (NON-)AGREEMENT principle.

Also the argument of the verb *udawać* 'pretend', although it is arguably a predicative phrase, complies with the CASE PRINCIPLE, rather than with the PREDICATIVE CASE (NON-)AGREEMENT principle (5.468), as shown in (5.375)–(5.377). This violates those theories which claim that it is exactly the predicative XPs that must satisfy a (non-)agreement principle such as (5.468). On the other hand, such facts are easy to explain in our approach: *udawać* is exceptional in requiring only co-indexation of its subject and the subject of its predicative complement, instead of the full structure-sharing of *synsems*. Given that, the subject of the predicative complement is marked as [RAISED −] and, thus, must obey the CASE PRINCIPLE, and not the PREDICATIVE CASE (NON-)AGREEMENT principle.

Are there any principles, though, responsible for the choice between co-indexing and full structure-sharing? In §5.4.2 we identified two such principles, repeated below:

(5.451) CONTROL PRINCIPLE (Polish):

$$\begin{array}{l}([\ \textsc{arg-st}\ \boxed{0}\ ] \wedge \\ \texttt{member}(\boxed{2}\mathrm{XP}_{\boxed{1}},\boxed{0}) \wedge \\ \texttt{member}(\mathrm{YP}[\mathit{verb},\ \textsc{subj}\ \langle\boxed{3}_{\boxed{1}}\rangle],\boxed{0})) \rightarrow (\boxed{2} = \boxed{3} \leftrightarrow \boxed{0} = \langle\boxed{2},\ldots\rangle)\end{array}$$

(5.444) RAISING PRINCIPLE (Polish):

If an element of a *word*'s ARG-ST is not assigned a role in this *word*'s CONTENT, then its *synsem* must be structure-shared with the *synsem* of some element of a lower ARG-ST.

The CONTROL PRINCIPLE (5.451) says that, whenever there are two elements on an ARG-ST, XP and YP, such that the index of XP is the same as the index of the unrealized subject of YP (and, in addition, YP is verbal), then XP and the subject of YP share full *synsem*s if and only if XP is the first element of this ARG-ST (it is a subject). On the other hand, the RAISING PRINCIPLE says that, in brief, raising involves full structure-sharing. These two principles together imply that, in Polish, there is no raising to a non-subject position of the kind exemplified by the English *I believe it to be true.*

However, in view of the developments of the previous Chapter, these principles need to be modified.

Note first that the RAISING PRINCIPLE is blatantly incompatible with the 'Adjuncts-as-Complements' approach. It rules that any elements of ARG-ST which do not correspond to semantic arguments must be raised from within other elements of ARG-ST. This principle correctly predicts that, e.g., in case of *wydawać się* 'seem', which has two elements on ARG-ST but only one semantic argument, corresponding to the second element of ARG-ST, the first element of this ARG-ST must be raised from within the second, but it also incorrectly forces all adjuncts on ARG-ST, which by definition do not correspond to any semantic arguments,[29] to be raised. Thus, clearly, the RAISING PRINCIPLE must be restricted to the original subcategorized elements of ARG-ST. This is easy to do in our formalization because such initial subcategorised arguments are exactly the arguments present on *basic* words (see the *sign* type hierarchy (9.47) on p.363). This observation leads to the following trivial modification of the RAISING PRINCIPLE.

(10.78) RAISING PRINCIPLE (Polish; revised):

> If an element of a *basic*'s ARG-ST is not assigned a role in this *basic*'s CONTENT, then its *synsem* must be structure-shared with the *synsem* of some element of a lower ARG-ST.

Interestingly, exactly the same restriction is necessary in the CONTROL PRINCIPLE. To see why, consider (10.79), from Franks (1995, p.264).[30]

(10.79) ?*Idąc sam, Jan przybył na czas.
going alone$_{nom}$ John$_{nom}$ arrived on time
'Going alone, John arrived on time.'

In (10.79), the adverbial present participle phrase *idąc sam* is obligatorily controlled by the subject of the main verb, i.e., *Jan*. Assuming that such participial adverbials are also added to the verb's ARG-ST, the current version of the CONTROL PRINCIPLE would force the full structure-sharing of *synsems* of the (unrealized) subject of *idąc* and the subject of *przybył*. This, however, would mean that the subject of *idąc* is nominative, i.e., it should agree with the 'semi-predicate' *sam*, contrary to facts. Instead, the non-agreeing form *samemu* should be used:

(10.80) Idąc samemu, Jan przybył na czas.
going alone$_{dat}$ John$_{nom}$ arrived on time
'Going alone, John arrived on time.'

Similar contrast is observed with respect to ordinary predicative APs:

(10.81) Będąc ?*punktualny / punktualnym, Jan przybył na czas.
being punctual$_{nom}$ / punctual$_{ins}$, John$_{nom}$ arrived on time
'Being punctual, John arrived on time.'

[29] With the possible exception of so-called thematic adjuncts; see Sanfilippo (1998) and references therein.
[30] Franks (1995) marks (10.79) with a '*', i.e., as clearly ungrammatical, but we are not sure whether (10.79) is completely unacceptable.

Note that the problem cannot be boiled down to the categorial setup of such adverbial participles, i.e., it cannot be solved by restricting the YP in the CONTROL PRINCIPLE to infinitival verbs. This is shown by purpose infinitives, such as (10.82).

(10.82) Poszedł do banku [załatwić formalności ?samemu / *sam].
went$_{3rd,sg,masc}$ to bank arrange$_{inf}$ formalities alone$_{dat}$ / alone$_{nom}$
'He went to the bank (in order) to [arrange the formalities alone].'

Although the bracketed phrase is a VP[*inf*] dependent, just like those which were discussed in §5.4.2 and led to the CONTROL PRINCIPLE, it is an adjunct according to the functional criterion (C3) and the syntactic-functional criterion (C3′) (but see fn.4 on p.313), and that is probably why its subject is only co-indexed with the subject of the main verb (as evidenced, again, but the unacceptability of the case-agreeing form *sam*).[31] Thus, the CONTROL PRINCIPLE should be restricted to arguments of *basic* words:

(10.83) CONTROL PRINCIPLE (Polish; revised):

$$\left(\begin{bmatrix} \textit{basic} \\ \ldots\text{ARG-ST } \boxed{0} \end{bmatrix} \wedge \right.$$
$$\texttt{member}(\boxed{2}\text{XP}_{\boxed{1}}, \boxed{0}) \wedge$$
$$\left.\texttt{member}(\text{YP}[\textit{verb}, \text{SUBJ } \langle \boxed{3}_{\boxed{1}} \rangle], \boxed{0})\right) \rightarrow (\boxed{2} = \boxed{3} \leftrightarrow \boxed{0} = \langle \boxed{2}, \ldots \rangle)$$

In summary, since the account of case marking of predicative phrases developed in §5.4 already implicitly assumed the 'Adjuncts-as-Complements' approach to modification, its heart, i.e., the PREDICATIVE CASE (NON-)AGREEMENT principle (5.468), together with the definition of case agreement in (5.466), did not require any modification. However, two auxiliary principles, the CONTROL PRINCIPLE and the RAISING PRINCIPLE needed to be restricted to true (subcategorized/thematic) arguments, i.e., to ARG-STs of *basic* words.

In fact, it seems that both these principles should be a part of a comprehensive theory of linking, relating semantic arguments (filling roles in CONTENT) with syntactic arguments (members of ARG-ST). As we are not concerned with linking in this study, we leave this possibility unexplored.[32]

10.3 Conclusions

In this final Chapter of this Part, we considered case assignment to adjuncts and saw that case assignment provides important evidence for the 'Adjuncts-as-Complements' approach to modification argued for in this Part. In particular, there are various syntactic case alternation phenomena in languages as diverse as Russian, Korean and Finnish, which fail to distinguish between complements and adjuncts (§10.1). Assuming the account of syntactic case assignment in terms of ARG-ST, extensively argued for in the previous Part of this study, this means

[31] Technically, this non-structure-sharing of *synsem*s may be ensured by a principle which says that the subject of adverbial participles is always [RAISED −].

[32] But see Wechsler (1995), Smith (1996) and Davis (1997) for theories of linking compatible (to varying extents) with the present framework.

that adjuncts must be present on ARG-ST, together with arguments. This similarity of case assignment behaviour of complements and adjuncts is confirmed by Polish semantic case facts (§10.2.1).

We also looked at certain Genitive of Negation (GoN) facts which have been claimed to reflect the complement/adjunct dichotomy. We saw that, on the contrary, these facts support our decision to treat case assignment to arguments and adjuncts alike, and that the distinction between obligatory and optional GoN correlates with (non)referentiality of relevant dependents instead. We accounted for that by encoding referentiality as subtypes of *index*...

(10.74)
$$\begin{array}{c} \textit{index} \\ \swarrow \quad \searrow \\ \textit{ref} \qquad \textit{non-ref} \end{array}$$

...and by modifying the principle responsible for the Genitive of Negation in Polish:

(10.76)
$$\begin{bmatrix} \textit{category} \\ \text{HEAD} \begin{bmatrix} \textit{verb} \\ \text{NEG} \ + \end{bmatrix} \\ \text{ARG-ST} \ \boxed{1}_{\textit{nelist}} \oplus \langle \text{CFC} \begin{bmatrix} \text{CASE} \ \textit{str} \\ \text{INDEX} \ \textit{ref} \end{bmatrix} \rangle \oplus \boxed{2}_{\textit{list}} \end{bmatrix} \rightarrow \begin{bmatrix} \text{ARG-ST} \ \boxed{1} \oplus \langle [\text{CASE} \ \textit{sgen}] \rangle \oplus \boxed{2} \end{bmatrix}$$

(10.77)
$$\begin{bmatrix} \textit{category} \\ \text{HEAD} \begin{bmatrix} \textit{verb} \\ \text{NEG} \ + \end{bmatrix} \\ \text{ARG-ST} \ \boxed{1}_{\textit{nelist}} \oplus \langle \text{CFC} \begin{bmatrix} \text{CASE} \ \textit{str} \\ \text{INDEX} \ \textit{non-ref} \end{bmatrix} \rangle \oplus \boxed{2}_{\textit{list}} \end{bmatrix} \rightarrow \begin{bmatrix} \text{ARG-ST} \ \boxed{1} \oplus \langle [\text{CASE} \ \textit{sacc} \vee \textit{sgen}] \rangle \oplus \boxed{2} \end{bmatrix}$$

Finally, we looked back at the CONTROL PRINCIPLE and the RAISING PRINCIPLE for Polish posited in the previous Part, and restricted both to true (thematic) arguments. Their final versions are repeated below, although both should probably be reformulated as parts of a more general theory of linking.

(10.78) RAISING PRINCIPLE (Polish; revised):

If an element of a *basic*'s ARG-ST is not assigned a role in this *basic*'s CONTENT, then its *synsem* must be structure-shared with the *synsem* of some element of a lower ARG-ST.

(10.83) CONTROL PRINCIPLE (Polish; revised):

$$\left(\begin{bmatrix} \textit{basic} \\ \ldots \text{ARG-ST} \ \boxed{0} \end{bmatrix} \wedge \right.$$
$$\texttt{member}(\boxed{2}\text{XP}_{\boxed{1}}, \boxed{0}) \wedge$$
$$\texttt{member}(\text{YP}[\textit{verb}, \text{SUBJ} \ \langle \boxed{3}_{\boxed{1}} \rangle], \boxed{0})) \rightarrow (\boxed{2} = \boxed{3} \leftrightarrow \boxed{0} = \langle \boxed{2}, \ldots \rangle)$$

Appendix A

Formalization in RSRL

A.1 Introduction

In this final chapter of the current study, we provide a mathematical formalization of the main parts of the account presented in the main body of this text, as well as fill certain analytical gaps conceptually irrelevant for the account presented in previous chapters (and, hence, omitted there), but non-negligible from the formalization point of view.[1]

As the underlying formalism we assume the Relational SRL (RSRL; see Richter (1997, 1999b,a) and Richter *et al.* (1999)), an extension of Paul King's Speciate Re-entrant Logic (SRL; King (1989, 1994); see also King (1999) and Pollard (1999)). The reasons for choosing RSRL are manifold: not only is it the most explicit and best developed formalism for HPSG available at the time of writing this study, but also, unlike other similar logics, it allows for full logical negation, full quantification (over components of an object) and for relations of the type often (even if implicitly) used in HPSG.

We will not introduce RSRL formally here; the reader is referred to *any* of Richter (1999b,a) and Richter *et al.* (1999), although the most accessible brief introduction to RSRL can be found in Richter *et al.* (1999), and the most extensive presentation of RSRL, together with an RSRL formalization of Pollard and Sag (1994), can be found in Richter (1999a).[2] Nevertheless, we will attempt below to present the RSRL formalization in such a way that it can (at least to some extent) be understood without intimate familiarity with the works cited above.

A.2 Basic Assumptions

An RSRL grammar consists of a signature and a theory. The signature contains a type hierarchy (a partial order) and feature appropriateness specifications (which features are appropriate for which types and what can their values be), as well as information about relation symbols and arities of relations used in the theory. The theory, on the other hand, is a set of constraints

[1] However, we ignore here various lexical entries posited throughout this study, including lexical entries of numerals discussed in §5.3.

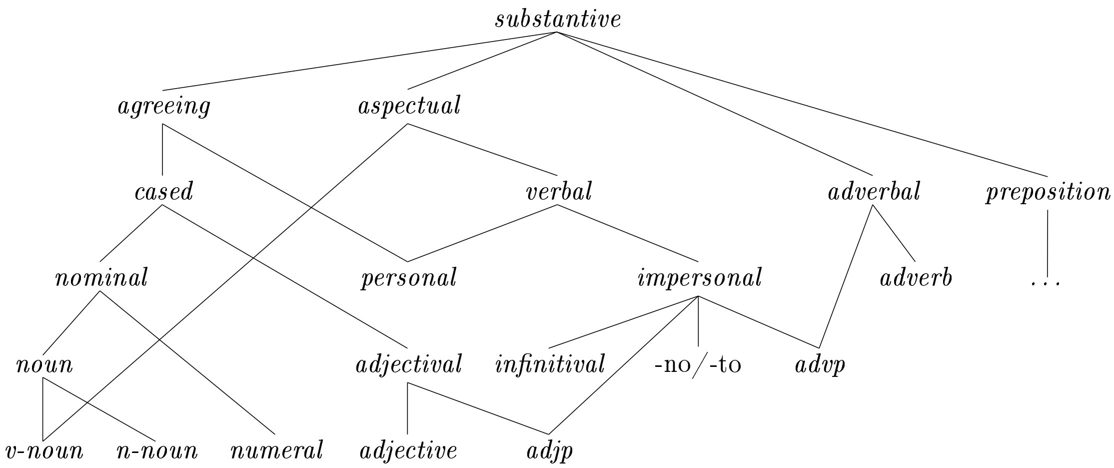
[2] An early (and slightly flawed) description of RSRL can be found in Richter (1997).

that all linguistic objects must satisfy.

When presenting the signature, we will ignore the information about relations; relation names and their arities can be extracted from their use in constraints. As for the type hierarchy and appropriateness specifications, we will present them as type hierarchy trees (or graphs), as common in the HPSG literature. In this section, we present certain non-standard assumptions about the signature for Polish.[3]

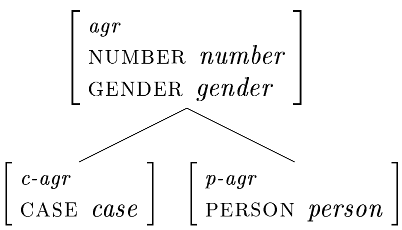
The most important difference between the standard (Pollard and Sag, 1994) type hierarchy and the one assumed here concerns HEAD values. We preserve the partition of HEAD values into *substantive* and *functional* (see (2.7) on p.17), but assume a much richer subhierarchy of *substantive* for Polish:

(A.1)



Let us briefly explain the import of the types introduced above. First, objects of type *agreeing* have feature AGR, whose values encode morphosyntactic agreement features. These values are of type *agr*, which is further split into *c-agr* (*c*ase *agr*eement) and *p-agr* (*p*erson *agr*eement):[4]

(A.2)



The type *c-agr* is the type of values of AGR on *cased* objects, while *p-agr* is the type of AGR

[3]See §2.1 for some *standard* assumptions about HPSG signatures.

[4]This is a modification of an HPSG account of Polish agreement in Czuba and Przepiórkowski (1995). As also discussed there and in Czuba (1997), number and gender should actually be analysed as two aspects of a single morphosyntactic feature.

values on *personal* (finite) verbs.[5]

Further, objects of type *aspectual* have the ASPECT feature, whose values are *perfective* or *imperfective*, two subtypes of *aspect*:

(A.3)

$$
\begin{array}{ccc}
 & \textit{aspect} & \\
\swarrow & & \searrow \\
\textit{perfective} & & \textit{imperfective}
\end{array}
$$

In Polish, not only *verbal* elements bear morphosyntactic aspect, but also so-called *verbal nouns* (see the type *v-noun*), which, however, are nouns in the sense that they decline for case and have grammatical gender.

It seems that *aspectual* objects are exactly the objects that bear the morphosyntactic *boolean*-valued feature NEG discussed in §5.2.2.

Let us look closer at subtypes of *verbal*. We have already seen *personal* verbs: these are the verbal forms which conjugate for number, gender and person. In Polish, there is a number of *impersonal* verbal forms: *infinitival*, -no/-to forms, as well as adjectival and adverbial participles (*adjp* and *advp*).[6] Inflectionally, adjectival participles are adjectival elements (they decline for case and grammatical gender) and roughly share their distributional properties with other adjectives, while adverbial participles are usually classified as (inflectional) adverbs. These mixed morphosyntactic properties are explicitly modelled in (A.1).

Turning to *cased* objects, they can be split into *nominal* and *adjectival*, the latter further partitioned into garden variety *adjective*s and adjectival participles (*adjp*). On the other hand, *nominal* objects are subdivided into *noun*s and *numeral*s; this split is equivalent to the one achieved via the boolean NUMERAL feature assumed in the main body of this study. Further, *noun*s are subclassified as either *v*erbal-*nouns* or *n*ominal-*nouns*, the former being actually mixed morphosyntactic categories (bearing grammatical aspect, unlike other *nominal* objects, but like all *verbal* objects).

Finally, we also include *preposition*s as *substantive* HEAD values; we assume that subtypes of *preposition* correspond to particular prepositions. Note that, this way, we employ the type hierarchy in order to express the kind of information usually expressed via features VFORM and PFORM.

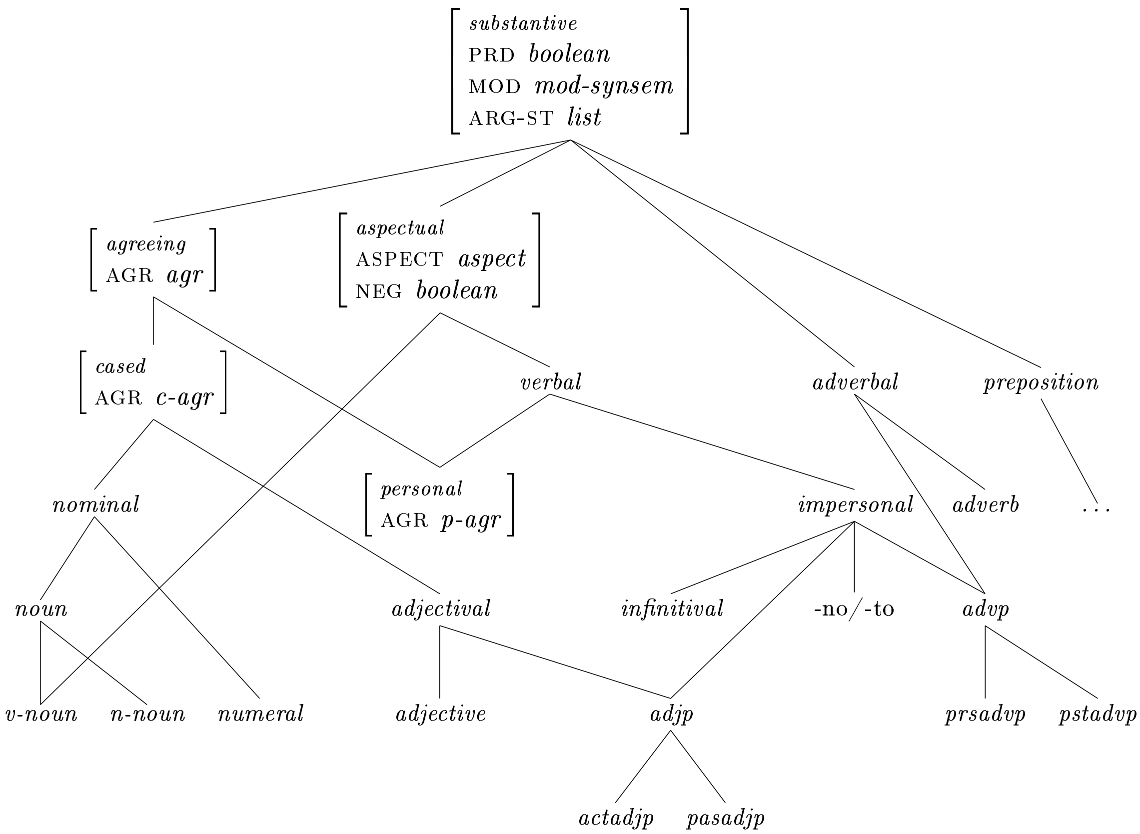
The type hierarchy in (A.1) may be amended in a number of ways; the most obvious extension requires partitioning adjectival participles (*adjp*) into active and passive, and adverbial participles (*advp*) into present and past (see §2.2.1). A more complete part of the signature corresponding to *substantial* objects, taking into consideration the new attributes introduced above, as well as the standard attributes PRD and MOD, is given below.

---

[5]We chose the names *personal* and *impersonal* instead of the more common *finite* and *non-finite*, respectively, because some subtypes of *personal* are inherently tensed (e.g., the -no/-to forms refer to the past) and in this sense they are finite.

[6]See §2.2 for examples of these verbal forms.

(A.4)



Note that, in accordance with the discussion in §5.4.1.2 and §5.4.3.2, we make ARG-ST a head feature here, but see §A.7 below for an alternative.

With this type hierarchy in hand, we can now formalize the VERB AGREEMENT PRINCIPLE developed in Czuba and Przepiórkowski (1995) and assumed in our analysis of numeral phrases in subject position. We stated this principle in Chapter 5 as (5.313)–(5.314):[7]

(5.313)
$$\begin{bmatrix} \textit{word} \\ \textsc{ss}|\textsc{loc}|\textsc{cat} \begin{bmatrix} \textsc{head}|\textsc{vform}\ \textit{fin} \\ \textsc{arg-st}\ \neg(\langle[\textsc{case}\ \textit{nom}]\rangle \oplus \boxed{0}) \end{bmatrix} \end{bmatrix} \rightarrow \begin{bmatrix} \textsc{ss}|\textsc{loc}|\textsc{cat}|\textsc{head}|\textsc{agr} \begin{bmatrix} \textsc{person}\ \textit{3rd} \\ \textsc{gender}\ \textit{neut} \\ \textsc{number}\ \textit{sg} \end{bmatrix} \end{bmatrix}$$

[7]Note that in (5.313)–(5.314), as in most constraints developed in previous chapters, ARG-ST is assumed to be appropriate for *category*, while in RSRL translations of these constraints, including (A.5) below, it is assumed to be appropriate for *head* or *substantive*, in accordance with the type hierarchy in (A.4).

$$(5.314)\quad \begin{bmatrix} \textit{word} \\ \textsc{ss}|\textsc{loc}|\textsc{cat} \begin{bmatrix} \textsc{head}|\textsc{vform}\ \textit{fin} \\ \textsc{arg-st}\ \left\langle [\textsc{case}\ \textit{nom}] \begin{bmatrix} \textsc{person}\ \boxed{1} \\ \textsc{gender}\ \boxed{2} \\ \textsc{number}\ \boxed{3} \end{bmatrix} \right\rangle \oplus \boxed{0} \end{bmatrix} \end{bmatrix} \rightarrow \begin{bmatrix} \textsc{ss}|\textsc{loc}|\textsc{cat}|\textsc{head}|\textsc{agr} \begin{bmatrix} \textsc{person}\ \boxed{1} \\ \textsc{gender}\ \boxed{2} \\ \textsc{number}\ \boxed{3} \end{bmatrix} \end{bmatrix}$$

What this principle says is that, if a finite verb has a nominative subject, then this verb's AGR value corresponds to the subject's INDEX value. Otherwise, the verb assumes the 'default' AGR value, i.e., 3rd person neuter singular.

Now, assuming the signature as (partially) given in (A.4), we can state the VERB AGREEMENT PRINCIPLE in RSRL in the following way:

$$
\begin{array}{ll}
\text{(A.5)} & \forall x\ [\\
& \quad [x \sim \textit{word} \\
& \quad \wedge\ x\text{SS LOC CAT HEAD} \sim \textit{personal}] \\
& \rightarrow \\
& \quad [\ [\neg x\text{SS LOC CAT HEAD ARG-ST FIRST LOC CAT HEAD AGR CASE} \sim \textit{nom} \\
& \quad \wedge\ x\text{SS LOC CAT HEAD AGR PERSON} \sim \textit{third} \\
& \quad \wedge\ x\text{SS LOC CAT HEAD AGR GENDER} \sim \textit{neut} \\
& \quad \wedge\ x\text{SS LOC CAT HEAD AGR NUMBER} \sim \textit{sg}] \\
& \vee \\
& \quad [x\text{SS LOC CAT HEAD ARG-ST FIRST LOC CAT HEAD AGR CASE} \sim \textit{nom} \\
& \quad \wedge\ x\text{SS LOC CAT HEAD AGR PERSON} \approx \\
& \qquad\qquad\qquad x\text{SS LOC CAT HEAD ARG-ST FIRST LOC CONT INDEX PERSON} \\
& \quad \wedge\ x\text{SS LOC CAT HEAD AGR GENDER} \approx \\
& \qquad\qquad\qquad x\text{SS LOC CAT HEAD ARG-ST FIRST LOC CONT INDEX GENDER} \\
& \quad \wedge\ x\text{SS LOC CAT HEAD AGR NUMBER} \approx \\
& \qquad\qquad\qquad x\text{SS LOC CAT HEAD ARG-ST FIRST LOC CONT INDEX NUMBER}]\ ]\ ]
\end{array}
$$

In words: for each object x, **if** the type of this object is *word* and the type of its SS|LOC|CAT|HEAD is *personal*, **then either** it is not true that the first element on this object's SS|LOC|CAT|HEAD|ARG-ST has LOC|CAT|HEAD|AGR|CASE of type *nom*, and (it is true that) this object's SS|LOC|CAT|HEAD|AGR|PERSON is of type *third*, and this object's SS... GENDER is *neut*, and this object's SS... NUMBER is *sg*, **or** the first element on this object's SS|LOC|CAT|HEAD|ARG-ST does have LOC|CAT|HEAD|AGR|CASE of type *nom*, and this object's SS... PERSON is equal to this first ARG-ST element's LOC|CONT|INDEX|PERSON, and this object's SS... GENDER is equal to this element's LOC|CONT|INDEX|GENDER, and this object's SS... NUMBER is equal to this first ARG-ST element's LOC|CONT|INDEX|NUMBER.[8]

[8] This principle should be slightly (and trivially) modified in view of the analysis of ARG-ST in §A.3 below as a list of *arguments*, not just *synsems*. This modification consists in adding ARG between FIRST and LOC in all paths containing the FIRST LOC sequence in (A.5). Also, a more transparent formalization would involve the 'root variable' ':' instead of the variable 'x' (see the remarks below (A.11) below), but we attempt to introduce RSRL notation gradually here.

Note that there is a minor difference between the version in (5.313)–(5.314) and the RSRL formalization in (A.5): the former assumes that *fin* is the value of the feature VFORM, while the latter assumes the type hierarchy (A.4), which defines *personal* as a subtype of *verbal*, itself a subtype of *substantive*, i.e., as a value of HEAD. Note also that this formalization assumes the standard HPSG rendering of lists as objects of type *list* with two appropriate features, *object*-valued FIRST and *list*-valued REST. More precisely:

(A.6)
$$\begin{array}{ccc} & \textit{list} & \\ & \diagup \quad \diagdown & \\ \textit{elist} & & \begin{bmatrix} \textit{nelist} \\ \text{FIRST } \textit{object} \\ \text{REST } \textit{list} \end{bmatrix} \end{array}$$

In the next section, we will formalize our basic analysis of case assignment in Polish.

A.3 Case Assignment

A.3.1 RAISED Marking

Recall that our analysis of non-configurational case marking developed in Chapter 4 required minor changes to values of ARG-ST and of VALENCE attributes; we assume a new type, *argument*, with two attributes, ARGUMENT (abbreviated to ARG) and RAISED:

(4.38)
$$\begin{bmatrix} \textit{argument} \\ \text{ARGUMENT } \textit{synsem} \\ \text{RAISED } \textit{bool} \end{bmatrix}$$

(A.7)
$$\begin{bmatrix} \textit{category} \\ \text{HEAD } \begin{bmatrix} \textit{head} \\ \text{ARG-ST } \textit{list(argument)} \end{bmatrix} \\ \text{VALENCE } \textit{valence} \end{bmatrix}$$

(A.8)
$$\begin{bmatrix} \textit{valence} \\ \text{SUBJECT } \textit{list(argument)} \\ \text{SPECIFIER } \textit{list(argument)} \\ \text{COMPLEMENTS } \textit{list(argument)} \end{bmatrix}$$

Note the use of the parametric types *list(argument)* in (A.7)–(A.8). In RSRL, parametric types are not a primitive notion, but their intended effect may be achieved in a relatively straightforward way, which we will illustrate with an example.

Consider possible values of ARG-ST, which are described in (A.7) as being of the parametric type *list(argument)*. In pure RSRL, this may be formalized by requiring (in the signature) values of ARG-ST to be of type *list*, and by positing (in the theory) a constraint ensuring that all elements of an ARG-ST are of type *argument*. This constraint could be formalized as in (A.9).

(A.9) $\forall x\ \forall y\ \forall z\ [\ [x\text{ARG-ST} \approx y\ \wedge\ \texttt{member}(z,y)]\ \rightarrow\ z \sim \textit{argument}\ ]$

In words: for all objects x, y, z, if y is the value of x's ARG-ST, and z is some member of this ARG-ST, then it (i.e., z) must be of type *argument*. What is new in this constraint with respect to (A.5) is the use of a relation, namely, `member`. In order to be meaningful, this relation—like all relations in RSRL—must be defined. This can be done via the following constraint:

(A.10) $\forall x\ \forall y\ [\texttt{member}(x,y) \leftrightarrow [x \approx y\text{FIRST} \lor \exists z\ [z \approx y\text{REST} \land \texttt{member}(x,z)]]]$

Using the Prolog-like notation defined in Richter (1999b), this constraint can be stated in the following more readable way:

(A.10′) $\texttt{member}(x,y) \stackrel{\forall}{\Longleftarrow}$
$x \approx y\text{FIRST}$
$\texttt{member}(x,y) \stackrel{\forall}{\Longleftarrow}$
$\exists z\ [z \approx y\text{REST} \land \texttt{member}(x,z)]$

Having enriched the signature, we must ensure that the values of RAISED really reflect the status of the argument: if the value is '+', then this argument is raised to the higher ARG-ST, if it is '−', then it is not. This is taken care of by a principle which was stated in Chapter 4 in the following, admittedly somewhat sloppy, way:

(4.40) $\textit{unembedded-sign} \rightarrow$
$(\forall\boxed{0},\boxed{1},\boxed{2},\boxed{3}\ (\boxed{0}\begin{bmatrix}\textit{category}\\ \text{HEAD}\ \boxed{1}\\ \text{ARG-ST}\ \boxed{2}\end{bmatrix} \land \texttt{member}(\boxed{3}\begin{bmatrix}\text{ARG}\ \boxed{4}\end{bmatrix}, \boxed{2}) \rightarrow$
$(\boxed{3}\begin{bmatrix}\text{RAISED}\ +\end{bmatrix} \leftrightarrow$
$\exists\begin{bmatrix}\text{ARG-ST}\ \boxed{5}\end{bmatrix}$
$(\texttt{member}(\begin{bmatrix}\text{ARG}\ \boxed{4}\end{bmatrix}, \boxed{5}) \land \texttt{member}(\begin{bmatrix}\text{ARG}|\text{LOC}|\text{CAT}|\text{HEAD}\ \boxed{1}\end{bmatrix}, \boxed{5})))))$

In words:

(4.41) In an unembedded sign (i.e., a sign corresponding to an utterance),
for each *category* object in this sign with [HEAD $\boxed{1}$] and [ARG-ST $\boxed{2}$],
for each element $\boxed{3}$[ARG $\boxed{4}$] on $\boxed{2}$,
this element is [RAISED +] iff
there is an ARG-ST containing an element with the same
[ARG $\boxed{4}$] and containing also an element with the [HEAD $\boxed{1}$].

Note that (4.40) is almost an RSRL formula. Below, we give a more careful RSRL formalization of this constraint.[9]

[9] This formalization assumes that root (unembedded) clauses are *signs* of type *unembedded-sign*. This is not an essential part of our analysis; for example, assuming the feature architecture as in Uszkoreit (1987), the antecedent in (A.11) (i.e., ': ∼ *unembedded-sign*') might be replaced by:

(i) $[: \sim \textit{phrase}\ \land\ :\text{MC} \approx +]$

(MC abbreviates here MAIN CLAUSE.)

(A.11)
$$
\begin{array}{l}
:\sim \textit{unembedded-sign} \\
\rightarrow \\
\quad \forall x_0 \forall x_1 \forall x_2 \forall x_3 \forall x_4 [\\
\quad [x_0 \text{HEAD} \approx x_1 \wedge x_1 \text{ARG-ST} \approx x_2 \wedge \texttt{member(}x_3\texttt{,}x_2\texttt{)} \wedge x_3 \text{ARG} \approx x_4] \\
\quad \rightarrow \\
\qquad [x_3 \text{RAISED} \sim + \\
\qquad \leftrightarrow \\
\qquad\quad \exists x_5 \exists x_6 \exists x_7 \exists x_8 \\
\qquad\quad [x_6 \text{ARG-ST} \approx x_5 \wedge \texttt{member(}x_7\texttt{,}x_5\texttt{)} \wedge x_7 \text{ARG} \approx x_4 \\
\qquad\quad \wedge \texttt{member(}x_8\texttt{,}x_5\texttt{)} \wedge x_8 \text{ARG LOC CAT HEAD} \approx x_1]]]
\end{array}
$$

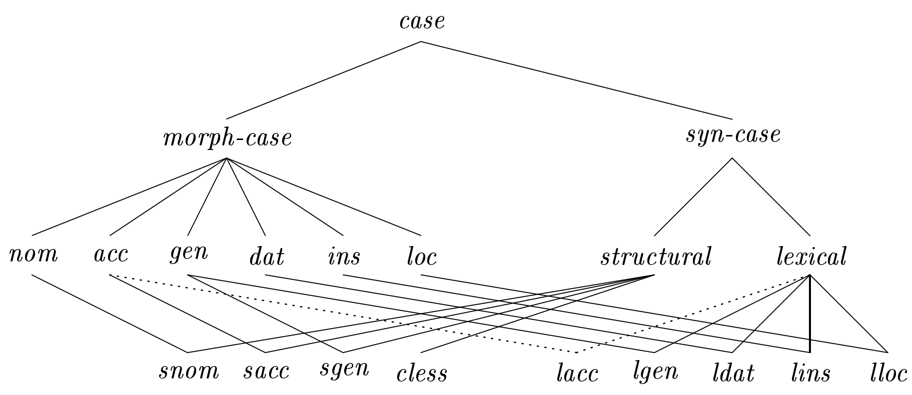
There is a new bit of notation in this formula that should be explained, namely, the colon ':'. Recall that RSRL constraints must be satisfied by *all* linguistic objects (i.e., all objects in a certain universe). There is a hidden quantification here: each constraint is 'applied' to *each* object in the linguistic universe. The colon ':' may be thought of as the variable bound by this implicit quantification. In other words, ':' always refers to the root linguistic object to which a given constraint is applied. This means that the constraint (A.11) has the following form: 'for each linguistic object (:), if this object (i.e., :) is of type *unembedded-sign*, then for each x_0, x_0 component of :, for each x_1, x_1 component of :, ...'. In fact, it is an important feature of RSRL that there is only implicit quantification over linguistic objects (in the sense that constraints must hold of *all* linguistic objects), while explicit quantification ($\forall$ and $\exists$) is restricted to components of an object (i.e., to objects accessible from a given object via paths).

A.3.2 Case Principle for Polish

Having dealt with the part of the analysis responsible for [RAISED +/−] marking, we move now to the part responsible for syntactic case assignment in Polish.

The type hierarchy for *case*, i.e., for values of the AGR|CASE attribute of *cased* objects is repeated below.

(5.421)



Recall that the dotted lines are not part of the official HPSG notation, but rather reflect our uncertainty as to whether the type *lacc* should be posited for Polish at all.

Recall also that CASE values corresponding to full *sign*s must be subtypes of *morph-case*, or—equivalently—*cless* cannot be morphologically realized. This is taken care of by (5.422), RSRL-ized in (A.12).

(5.422) $\begin{bmatrix} \textit{sign} \\ \text{SS}|\ldots|\text{CASE } \boxed{1} \end{bmatrix} \rightarrow \boxed{1} = \textit{morph-case}$

(A.12) $\forall x\ [\ [{:}\sim \textit{sign}\ \wedge\ {:}\text{SS LOC CAT HEAD AGR CASE} \approx x]\ \rightarrow\ x \sim \textit{morph-case}\ ]$

An equivalent (in view of the signature assumed here), but perhaps slightly more readable way of formalizing (5.422) is given in (A.12′).

(A.12′) $:\text{SS LOC CAT HEAD} \sim \textit{cased}\ \rightarrow\ :\text{SS LOC CAT HEAD AGR CASE} \sim \textit{morph-case}$

In words: for each linguistic object, if its SS|LOC|CAT|HEAD is of type *cased* (i.e., if it has CASE attribute at all), then the value of its SS... HEAD|AGR|CASE must be of type *morph-case*.[10]

Let us move now to the actual CASE PRINCIPLE for Polish. Recall that it resolves structural case of only those elements of ARG-ST which have the form of 'Complete Functional Complexes' ('CFCs'), with CFC defined as below:

(5.381) $\text{CFC} \stackrel{\text{df}}{=} \begin{bmatrix} \textit{arg} \\ \text{ARG}\ \ \text{XP}\begin{bmatrix}\text{SUBJ list}(\begin{bmatrix} \textit{arg} \\ \text{ARG YP} \\ \text{RAISED } - \end{bmatrix})\end{bmatrix} \\ \text{RAISED } - \end{bmatrix}$

In order to check whether an argument is a CFC, we will define an RSRL relation, `cfc`...

(A.13) $\texttt{cfc}(x) \stackrel{\forall}{\Longleftarrow}$
$\texttt{raised-}(x) \wedge$
$\forall y \forall z[[x\text{ARG LOC CAT VAL SUBJ} \approx y \wedge \texttt{member}(z,y)] \rightarrow \texttt{raised-}(z)]$

...and an auxiliary relation `raised-`:

(A.14) $\texttt{raised-}(x) \stackrel{\forall}{\Longleftarrow}$
$x \sim \textit{arg}\ \wedge\ x\text{RAISED} \sim -$

Additionally, since our CASE PRINCIPLE resolves case of only *structural* CFC *argument*s, we define a relation `str-cfc`, checking whether a given object is a CFC[CASE *str*]:

(A.15) $\texttt{str-cfc}(x) \stackrel{\forall}{\Longleftarrow}$
$\texttt{cfc}(x) \wedge$
$x\text{ARG LOC CAT HEAD AGR CASE} \sim \textit{str}$

[10]Note that objects which satisfy the antecedent of (A.12′) must be *sign*s, because the attribute SYNSEM (abbreviated here to SS) is appropriate for *sign*s only.

With these auxiliary relations in hand, we are ready to provide an RSRL formalization of our CASE PRINCIPLE FOR POLISH. Below, we recall the final versions of particular clauses making up the CASE PRINCIPLE, and state each of them in RSRL, taking into consideration the modifications to the type subhierarchy for *substantive* introduced in §A.2 (cf. (A.4) on p.420).[11]

(5.423) $$\begin{bmatrix} \textit{category} \\ \text{HEAD } \textit{verb}\neg[\textit{fin}] \\ \text{ARG-ST } \langle \text{CFC}[\text{CASE } \textit{str}]\rangle \oplus \boxed{1} \end{bmatrix} \rightarrow \begin{bmatrix} \text{ARG-ST } \langle[\text{CASE } \textit{cless}]\rangle \oplus \boxed{1} \end{bmatrix}$$

(A.16) $\forall x$ [
$[: \sim \textit{impersonal}$
$\wedge : \text{ARG-ST FIRST} \approx x$
$\wedge\ \texttt{str-cfc}(x)] \quad \rightarrow \quad x\text{ARG LOC CAT HEAD AGR CASE} \sim \textit{cless}$]

(5.424) $$\begin{bmatrix} \textit{category} \\ \text{HEAD } \textit{verb}[\textit{fin}] \\ \text{ARG-ST } \langle \text{CFC}\begin{bmatrix} \text{CASE } \textit{str} \\ \text{NUM } - \end{bmatrix}\rangle \oplus \boxed{1} \end{bmatrix} \rightarrow \begin{bmatrix} \text{ARG-ST } \langle[\text{CASE } \textit{snom}]\rangle \oplus \boxed{1} \end{bmatrix}$$

(A.17) $\forall x$ [
$[: \sim \textit{personal}$
$\wedge : \text{ARG-ST FIRST} \approx x$
$\wedge\ \texttt{str-cfc}(x)$
$\wedge\ x\text{ARG LOC CAT HEAD} \sim \textit{noun}] \quad \rightarrow \quad x\text{ARG LOC CAT HEAD AGR CASE} \sim \textit{snom}$]

(5.425) $$\begin{bmatrix} \textit{category} \\ \text{HEAD } \textit{verb}[\textit{fin}] \\ \text{ARG-ST } \langle \text{CFC}\begin{bmatrix} \text{CASE } \textit{str} \\ \text{NUM } + \end{bmatrix}\rangle \oplus \boxed{1} \end{bmatrix} \rightarrow \begin{bmatrix} \text{ARG-ST } \langle[\text{CASE } \textit{sacc}]\rangle \oplus \boxed{1} \end{bmatrix}$$

(A.18) $\forall x$ [
$[: \sim \textit{personal}$
$\wedge : \text{ARG-ST FIRST} \approx x$
$\wedge\ \texttt{str-cfc}(x)$
$\wedge\ x\text{ARG LOC CAT HEAD} \sim \textit{numeral}] \rightarrow x\text{ARG LOC CAT HEAD AGR CASE} \sim \textit{sacc}$]

(5.384) $$\begin{bmatrix} \textit{category} \\ \text{HEAD } \begin{bmatrix} \textit{verb} \\ \text{NEG } - \end{bmatrix} \\ \text{ARG-ST } \boxed{1}_{\textit{nelist}} \oplus \langle \text{CFC}[\text{CASE } \textit{str}]\rangle \oplus \boxed{2}_{\textit{list}} \end{bmatrix} \rightarrow \begin{bmatrix} \text{ARG-ST } \boxed{1} \oplus \langle[\text{CASE } \textit{sacc}]\rangle \oplus \boxed{2} \end{bmatrix}$$

(A.19) $\forall x\ \forall y$ [
$[: \sim \textit{verbal}$
$\wedge : \text{NEG} \sim -$
$\wedge : \text{ARG-ST REST} \approx y$
$\wedge\ \texttt{member}(x,y)$
$\wedge\ \texttt{str-cfc}(x)] \rightarrow x\text{ARG LOC CAT HEAD AGR CASE} \sim \textit{sacc}$]

[11] There are much more compact ways of stating this CASE PRINCIPLE in RSRL, which, however, are less readable.

(10.76) $\begin{bmatrix} \textit{category} \\ \text{HEAD} \begin{bmatrix} \textit{verb} \\ \text{NEG} \ + \end{bmatrix} \\ \text{ARG-ST} \ \boxed{1}_{\textit{nelist}} \oplus \langle \text{CFC} \begin{bmatrix} \text{CASE} \ \textit{str} \\ \text{INDEX} \ \textit{ref} \end{bmatrix} \rangle \oplus \boxed{2}_{\textit{list}} \end{bmatrix} \rightarrow \begin{bmatrix} \text{ARG-ST} \ \boxed{1} \oplus \langle [\text{CASE} \ \textit{sgen}] \rangle \oplus \boxed{2} \end{bmatrix}$

(A.20) $\forall x \, \forall y$ [
[: $\sim$ *verbal*
$\wedge$: NEG $\sim +$
$\wedge$: ARG-ST REST $\approx y$
$\wedge$ `member(`x`,`y`)`
$\wedge$ `str-cfc(`x`)`
$\wedge$ xARG LOC CONT INDEX $\sim$ *ref*] $\rightarrow$ xARG LOC CAT HEAD AGR CASE $\sim$ *sgen*]

(10.77) $\begin{bmatrix} \textit{category} \\ \text{HEAD} \begin{bmatrix} \textit{verb} \\ \text{NEG} \ + \end{bmatrix} \\ \text{ARG-ST} \ \boxed{1}_{\textit{nelist}} \oplus \langle \text{CFC} \begin{bmatrix} \text{CASE} \ \textit{str} \\ \text{INDEX} \ \textit{non-ref} \end{bmatrix} \rangle \oplus \boxed{2}_{\textit{list}} \end{bmatrix} \rightarrow \begin{bmatrix} \text{ARG-ST} \ \boxed{1} \oplus \langle [\text{CASE} \ \textit{sacc} \vee \textit{sgen}] \rangle \oplus \boxed{2} \end{bmatrix}$

(A.21) $\forall x \, \forall y$ [
[: $\sim$ *verbal*
$\wedge$: NEG $\sim +$
$\wedge$: ARG-ST REST $\approx y$
$\wedge$ `member(`x`,`y`)`
$\wedge$ `str-cfc(`x`)`
$\wedge$ xARG LOC CONT INDEX $\sim$ *non-ref*]
$\rightarrow$
[xARG LOC CAT HEAD AGR CASE $\sim$ *sacc*
$\vee$ xARG LOC CAT HEAD AGR CASE $\sim$ *sgen*]]

(5.386) $\begin{bmatrix} \textit{category} \\ \text{HEAD} \ \textit{prep} \\ \text{ARG-ST} \ \langle \text{CFC}[\text{CASE} \ \textit{str}] \rangle \end{bmatrix} \rightarrow \begin{bmatrix} \text{ARG-ST} \ \langle [\text{CASE} \ \textit{sacc}] \rangle \end{bmatrix}$

(A.22) $\forall x$ [
[: $\sim$ *preposition*
$\wedge$: ARG-ST FIRST $\approx x$
$\wedge$: ARG-ST REST $\sim$ *elist*
$\wedge$ `str-cfc(`x`)`] $\rightarrow$ xARG LOC CAT HEAD AGR CASE $\sim$ *sacc*]

A couple of minor notes concerning this formalization are in order. First, in accordance with the type hierarchy (A.4) for the HEAD values in Polish, we replaced '*verb*¬[*fin*]' in (5.423) with '*impersonal*' in (A.16), '*verb*[*fin*]' in (5.424)–(5.425) with '*personal*' in (A.17)–(A.18), '[NUM −]' in (5.424) with '*noun*' in (A.17), '[NUM +]' in (5.425) with '*numeral*' in (A.18), '*verb*' in (5.384) and (10.76)–(10.77) with '*verbal*' in (A.19)–(A.21), and '*prep*' in (5.386) with '*preposition*' in (A.22).

Second, recall that we assume that INDEX values can be partitioned into *ref*erential and *non-ref*erential:

(10.74)

$$\begin{array}{c} \textit{index} \\ \diagup \quad \diagdown \\ \textit{ref} \quad \textit{non-ref} \end{array}$$

We capitalize on this distinction in the clauses of CASE PRINCIPLE responsible for the Genitive of Negation (cf. (10.76)–(10.77) or (A.20)–(A.21) above).

Finally, the constraints (A.16)–(A.22) are actually constraints on *head* objects, and not on *category* objects, like the original formulations. This change was possible because we assume here that ARG-ST is a *head* attribute (but see §A.7).

Before moving to case agreement, we will state one more principle in RSRL, which we assumed in our account of long distance Genitive of Negation (LD GoN) in §5.2.3. We argued there that LD GoN is not long distance at all, and that the apparent 'long distance' effect results from argument raising in Polish clause union ('Verb Clusters') environment. Although we did not provide a detailed analysis of such argument raising, we discussed various such possible analyses, and we argued that this argument raising cannot take place across verbal negation:

(5.210) NO RAISING ACROSS NEGATION:

$$\begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} \\ \text{NEG} \ + \end{bmatrix} \\ \text{ARG-ST} & \langle \boxed{0} \rangle \oplus \boxed{1} \end{bmatrix} \rightarrow \boxed{1} = \text{list}(\text{XP}^{-})$$

(A.23)

$$\begin{array}{l} \forall x \ \forall y \ [\\ \quad [: \sim \textit{verbal} \\ \quad \wedge \ :\text{NEG} \sim + \\ \quad \wedge \ :\text{ARG-ST REST} \approx y \\ \quad \wedge \ \texttt{member}(x, y)] \ \rightarrow \ \texttt{raised-}(x) \ ] \end{array}$$

A.4 Case Agreement

Our account of case (non-)agreement developed in §5.4 is summarised below:

(5.466)

$$\texttt{case-agreement}(\boxed{1}\textit{case}, \ \boxed{2}\textit{head}) \leftrightarrow (\boxed{2} = [\text{CASE} \ \boxed{1}] \vee \boxed{2} = \begin{bmatrix} \text{ARG-ST} \ \langle [\text{CASE} \ \boxed{1}], \ldots \rangle \\ \text{NUM} \ + \end{bmatrix})$$

(5.467) ATTRIBUTIVE CASE AGREEMENT:

$$\begin{bmatrix} \textit{head} \\ \text{CASE} \ \boxed{1} \\ \text{MOD}|\text{LOC}|\text{CAT}|\text{HEAD} \ \boxed{2}[\text{CASE} \ \boxed{0}] \end{bmatrix} \rightarrow \texttt{case-agreement}(\boxed{1}, \ \boxed{2})$$

(5.468) PREDICATIVE CASE (NON-)AGREEMENT:

$$\begin{bmatrix} \text{VAL}|\text{SUBJ} \ \langle \text{XP}^{+}[\text{HEAD} \ \boxed{3}[\text{CASE} \ \boxed{1}]] \rangle \\ \text{HEAD}|\text{CASE} \ \boxed{2} \end{bmatrix} \rightarrow$$

$$\texttt{case-agreement}(\boxed{2}, \ \boxed{3}) \vee (\boxed{1} = \textit{str} \wedge \boxed{2} = \textit{lins})$$

It should be clear by now that the relation `case-agreement` and the principles PREDICATIVE CASE (NON-)AGREEMENT and ATTRIBUTIVE CASE AGREEMENT are directly formalizable in RSRL:[12]

(A.24) $\texttt{case-agreement}(x,y) \stackrel{\forall}{\Longleftarrow}$
$\quad y\text{AGR CASE} \approx x$
$\texttt{case-agreement}(x,y) \stackrel{\forall}{\Longleftarrow}$
$\quad y\text{ARG-ST FIRST ARG LOC CAT HEAD AGR CASE} \approx x$
$\quad \wedge\ y \sim \textit{numeral}$

(A.25) ATTRIBUTIVE CASE AGREEMENT:

$\forall x\ \forall y\ [$
$\quad [{:}\ \text{AGR CASE} \approx x$
$\quad \wedge\ {:}\ \text{MOD LOC CAT HEAD} \approx y$
$\quad \wedge\ y \sim \textit{cased}] \quad \rightarrow \quad \texttt{case-agreement}(x,y)\ ]$

(A.26) PREDICATIVE CASE (NON-)AGREEMENT:

$\forall x\ \forall y\ \forall z\ [$
$\quad [{:}\ \text{VAL SUBJ FIRST} \approx x$
$\quad \wedge\ {:}\ \text{HEAD AGR CASE} \approx y$
$\quad \wedge\ x\text{RAISED} \sim +$
$\quad \wedge\ x\text{ARG LOC CAT HEAD} \approx z]$
$\quad \rightarrow$
$\qquad [\texttt{case-agreement}(y,z)$
$\qquad \vee\ [z\text{AGR CASE} \sim \textit{str}\ \wedge\ y \sim \textit{lins}]]\ ]$

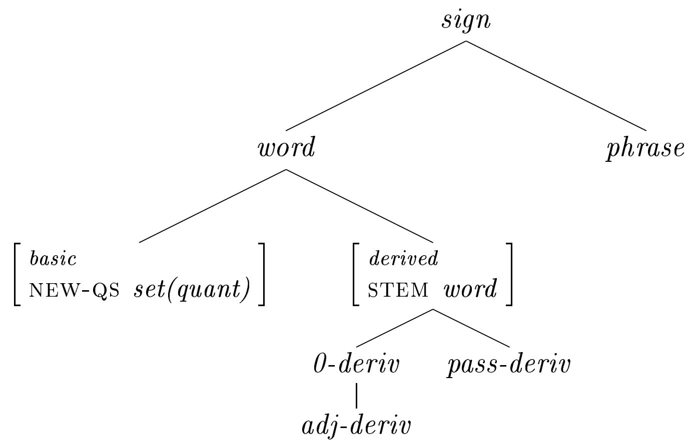
A.5 'Adjuncts-as-Complements'

This section contains a formalization of the rendering of the 'Adjuncts-as-Complements' idea proposed in Chapter 9, as well as the analysis of quantification developed there.

We start with the new type hierarchy for *sign*:

[12] Note that in (5.466), the specification of $\boxed{1}$ as bearing the type *case* and of $\boxed{2}$ as being of type *head* are actually redundant, and they are dropped in (A.24).

(9.47)



The type *set* represents sets of *object*s and, analogously to *list*, has two subtypes, i.e., *eset* and *neset*. See Richter (1999a) for further details concerning representation of sets in RSRL.

The constraint (9.48) on *0-deriv* is stated in RSRL in (A.27).

(9.48) $$\textit{0-deriv} \rightarrow \begin{bmatrix} \text{PHON } \boxed{0} \\ \text{STEM}|\text{PHON } \boxed{0} \end{bmatrix}$$

(A.27) $: \sim \textit{0-deriv} \rightarrow :\text{PHON} \approx :\text{STEM PHON}$

The constraint (9.49) on *adj-deriv* is slightly less trivial; it is RSRL-ized in (A.28).[13]

(9.49) $$\textit{adj-deriv} \rightarrow \begin{bmatrix} \text{CAT}|\text{ARG-ST } \boxed{1} \oplus \langle \text{XP}\begin{bmatrix} \text{MOD } \boxed{2} \\ \text{CONT } \boxed{3} \end{bmatrix}\rangle \\ \text{CONT } \boxed{3} \\ \text{STEM}|\text{SYNSEM } \boxed{2}\begin{bmatrix} \text{CAT}|\text{ARG-ST } \boxed{1} \end{bmatrix} \end{bmatrix}$$

(A.28)
$$\begin{array}{l} : \sim \textit{adj-deriv} \rightarrow \\ \quad \exists x_0\ \exists x_1\ \exists y\ [\\ \qquad :\text{STEM SS LOC CAT HEAD ARG-ST} \approx x_1 \\ \qquad \wedge :\text{STEM SS} \approx x_0\text{FIRST ARG LOC CAT HEAD MOD} \\ \qquad \wedge :\text{SS LOC CONT} \approx x_0\text{FIRST ARG LOC CONT} \\ \qquad \wedge\ \texttt{append}(x_1, x_0, y) \\ \qquad \wedge :\text{SS LOC CAT HEAD ARG-ST} \approx y\ ] \end{array}$$

The relation `append` used in (A.28) is defined in (A.29):

(A.29)
$$\begin{array}{l} \texttt{append}(x, y, z) \stackrel{\forall}{\Longleftarrow} \\ \qquad x \sim \textit{elist} \ \wedge\ y \approx z \\ \texttt{append}(x, y, z) \stackrel{\forall}{\Longleftarrow} \\ \qquad x\text{FIRST} \approx z\text{FIRST} \wedge \\ \qquad \exists x_1\ \exists z_1\ [\ x_1 \approx x\text{REST} \wedge z_1 \approx z\text{REST} \wedge \texttt{append}(x_1, y, z_1)\ ] \end{array}$$

[13] Actually, in the full version of (A.28), there should be more token identities between the STEM of an object and the object itself. We do not include these identities here for the sake of clarity.

Moving now to our theory of quantification, we summarize it below:

(9.60) $\begin{bmatrix} \textit{content} \\ \text{QSTORE } \textit{set(quant)} \end{bmatrix}$

$\textit{psoa} \quad \textit{nom-obj} \quad \textit{quant}$

(9.90) $\textit{basic} \rightarrow \text{Desc}_{12} \vee \text{Desc}_3$

(9.71) $\text{Desc}_{12} = \begin{bmatrix} \text{SS|LOC|CONT} & \begin{bmatrix} \textit{nom-obj} \vee \textit{quant} \\ \text{QSTORE } \boxed{1} \end{bmatrix} \vee \begin{bmatrix} \textit{psoa} \\ \text{QSTORE } \boxed{2} \\ \text{QUANTS } \boxed{3} \end{bmatrix} \\ \text{NEW-QS } \boxed{5} & \end{bmatrix}$

where $\boxed{1} = \boxed{5} \uplus$ the union of QSTOREs of selected arguments,
$\boxed{4} =$ the set of elements of $\boxed{3}$,
$\boxed{1} = \boxed{2} \uplus \boxed{4}$.

(9.61) $\text{Desc}_3 = \begin{bmatrix} \text{SS|LOC|CONT } \boxed{1} \\ \text{ARG-ST } \langle \ldots, [\text{CONT } \boxed{1}], \ldots \rangle \end{bmatrix}$

Let us first provide an RSRL formula corresponding to Desc_3:

(A.30) $\exists x_0 \, \exists x_1$ [
$:\text{SS LOC CAT HEAD ARG-ST} \approx x_0$
$\wedge$ **member**(x_1, x_0)
$\wedge :\text{SS LOC CONT} \approx x_1\text{ARG LOC CONT}$]

Desc_{12} is much more complex. Its RSRL formalization is provided in (A.31),[14] so the whole theory of quantification proposed here is formalized as the constraint (A.32).

(A.31) $\exists y_0 \, \exists y_1 \, \exists x_1 \, \exists x_2 \, \exists x_3 \, \exists x_4 \, \exists x_5$ [
$y_0 \approx :\text{SS LOC CAT HEAD ARG-ST}$
$\wedge$ **qs-union**(y_0, y_1)
$\wedge\ x_5 \approx :\text{NEW-QS}$
$\wedge$ **union**(y_1, x_5, x_1)
$\wedge$ [[$\neg:\text{SS LOC CONT} \sim \textit{psoa} \ \wedge\ :\text{SS LOC CONT QSTORE} \approx x_1$]
$\vee$ [$:\text{SS LOC CONT} \sim \textit{psoa}$
$\wedge\ x_2 \approx :\text{SS LOC CONT QSTORE}$
$\wedge\ x_3 \approx :\text{SS LOC CONT QUANTS}$
$\wedge$ **list-to-set**(x_3, x_4)
$\wedge$ **union**(x_2, x_4)]]]

(A.32) $:\sim \textit{basic} \rightarrow$ [
$\exists y_0 \, \exists y_1 \, \exists x_1 \, \exists x_2 \, \exists x_3 \, \exists x_4 \, \exists x_5$ [(Desc_{12}; cf. (A.31))
$y_0 \approx :\text{SS LOC CAT HEAD ARG-ST}$
$\wedge$ **qs-union**(y_0, y_1)

[14] To enhance readability, the variables $x_1, \ldots, x_5$ in (A.31) correspond to $\boxed{1}, \ldots, \boxed{5}$ in (9.71), respectively.

$\wedge\ x_5 \approx$: NEW-QS
$\wedge$ `union`(y_1,x_5,x_1)
$\wedge$ [[$\neg$: SS LOC CONT $\sim$ *psoa* $\wedge$: SS LOC CONT QSTORE $\approx x_1$]
$\vee$ [: SS LOC CONT $\sim$ *psoa*
$\wedge\ x_2 \approx$: SS LOC CONT QSTORE
$\wedge\ x_3 \approx$: SS LOC CONT QUANTS
$\wedge$ `list-to-set`(x_3,x_4)
$\wedge$ `union`(x_2,x_4)]]]

$\vee$

$\exists x_0\ \exists x_1$ [(Desc$_3$; cf. (A.30))
: SS LOC CAT HEAD ARG-ST $\approx x_0$
$\wedge$ `member`(x_1,x_0)
$\wedge$: SS LOC CONT $\approx x_1$ARG LOC CONT]]

There are three new relations in (A.31): `union`, `list-to-set` and `qs-union`. The relation `union` holds between two sets and their union, the relation `list-to-set` holds between a list of objects and the set of these objects, and the relation `qs-union` collects the values of QSTOREs of the selected (in the sense to be made below) elements of the first argument (which is supposed to be a list of *argument* objects) into the set expressed by the second argument of this relation.

Since we do not want to go into representation of sets in RSRL here, we will not formalize relations `union` and `list-to-set`; see Richter (1999a) for formalization of sets in RSRL and for the definition of relations corresponding to standard operations on sets (including `union`, `difference`, `intersection`, `disjoint-union`, etc.). Below, we will only provide the definition of `qs-union`.

Recall from §9.3.2.2 that we are interested in the union of QSTOREs of *selected* arguments of ARG-ST only, where selected arguments of a ARG-ST are those arguments which are *not* raised from other elements of this ARG-ST.[15] More precisely, an element x on a list z is raised iff there is an element y on this list such that x is in the ARG-ST attribute of y:

(A.33) `raised`(x,z) $\stackrel{\forall}{\Longleftarrow}$
$\exists y\ \exists u$ [
`member`(y,z)
$\wedge\ u \approx y$ARG LOC CAT HEAD ARG-ST
$\wedge$ `member`(x,u)]]

The definition of `qs-union` requires one more auxiliary relation, i.e., `selected-qs-union`:

(A.34) `selected-qs-union`(x_0,x,y) $\stackrel{\forall}{\Longleftarrow}$
$x \sim$ *elist*
$\wedge\ y \sim$ *eset*
`selected-qs-union`(x_0,x,y) $\stackrel{\forall}{\Longleftarrow}$

[15]Incidentally, note that the value of the RAISED attribute will not be helpful here as it only indicates whether a given argument is raised *higher*, and not whether it is raised from a *lower* constituent.

$$\begin{array}{l}\exists x_1\ \exists x_2\ \exists y_1\ \exists y_2\ [\\ \quad x_1 \approx x\text{FIRST}\\ \quad \wedge\ x_2 \approx x\text{REST}\\ \quad \wedge\ \texttt{selected-qs-union}(x_0,x_2,y_1)\\ \quad \wedge\ [\texttt{raised}(x_1,x_0) \rightarrow y \approx y_1]\\ \quad \wedge\ [\neg\texttt{raised}(x_1,x_0) \rightarrow [y_2 \approx x_1\text{ARG LOC CONT QSTORE} \wedge \texttt{union}(y_1,y_2,y)]]]\end{array}$$

With this relation in hand, the definition of `qs-union` is trivial:

(A.35) $\texttt{qs-union}(x,y) \overset{\forall}{\Longleftarrow}$
$\texttt{selected-qs-union}(x,x,y)$

This completes the RSRL formalization of our analysis of the 'Adjuncts-as-Complements' approach and of quantification in HPSG, but, for completeness, we add an RSRL formalization of *wh*-retrieval, sketched in §9.3.2.4, and summarised below:

(9.79) At any filler-head node, if the filler has nonempty QUE value, then its member must belong to the node's QUANTS value.

(9.80) If the QUANTS of a *psoa* contains a *wh*-quantifier, it must also contain the QUE member of a left peripheral daughter of some semantic projection of this *psoa*.

(9.79) is trivial to formalize:[16]

$$\begin{array}{ll}\text{(A.36)} & \forall x_1\ \forall x_2\ \forall y\ [\\ & \quad [x_1 \approx \text{:DTRS FILL-DTR SS NONLOC QUE}\\ & \quad \wedge\ x_2 \approx \text{:SS LOC CONT QUANTS}\\ & \quad \wedge\ \texttt{member}(y,x_1)] \rightarrow \texttt{member}(y,x_2)\ ]\end{array}$$

(9.80) is less trivial and it must be formalized as a global constraint. What the constraint below says is that, in each root clause (see fn.9 on p.423), if the QUANTS list of a *psoa* contains a *wh*-quantifier, there must be a semantic projection involving a left-periphery *wh*-phrase, whose QUE member is also on this QUANTS list.[17]

$$\begin{array}{ll}\text{(A.37)} & :\sim \textit{unembedded-sign} \rightarrow \forall w\ \forall w_1\ \forall q\ [\\ & \quad [\texttt{wh-quantifier}(q)\\ & \quad \wedge\ w \sim \textit{word}\\ & \quad \wedge\ w_1 \approx w\text{SS LOC CONT QUANTS}\end{array}$$

[16]Note that in (A.36) the second argument of the first use of `member` is a set, while our definition of `member` in (A.10) on p.423 assumed that the second argument is a list. See Richter (1999a) for a formalization of `member` which licenses its use in (A.36). This generalized relation `member` is also assumed in (A.37).

[17]On the basis of Pollard and Yoo (1998), a wh-*quantifier* could be preliminarily defined as a quantifier, whose DET is of sort *which*, i.e.:

(i) $\texttt{wh-quantifier}(q) \overset{\forall}{\Longleftarrow}$
$q\text{DET} \sim \textit{which}$

$$
\begin{array}{l}
\land\ \texttt{member}(q,w_1)] \\
\rightarrow \exists x\ \exists x_1\ \exists q_1\ [\\
\quad \texttt{semantic-projection}(x,w) \\
\quad \land\ \texttt{member}(q_1,w_1) \\
\quad \land\ \texttt{member}(q_1,x_1) \\
\quad \land\ [x_1 \approx x\textrm{DTRS SUBJ-DTR FIRST SS NONLOC QUE} \\
\qquad \lor\ x_1 \approx x\textrm{DTRS FILL-DTR FIRST SS NONLOC QUE}]\ ]\ ]
\end{array}
$$

A node is a semantic projection of a word if it is the word or if a semantic projection of the word is the semantic daughter of the node:

(A.38)
$$
\begin{array}{l}
\texttt{semantic-projection}(x,y) \stackrel{\forall}{\Longleftarrow} \\
\qquad x \approx y \\
\texttt{semantic-projection}(x,y) \stackrel{\forall}{\Longleftarrow} \\
\qquad \exists x_1[\texttt{semantic-projection}(x_1,y) \land \texttt{semantic-daughter}(x_1,x)]
\end{array}
$$

The relation `semantic-daughter` is defined as in Pollard and Sag (1994):

(A.39)
$$
\begin{array}{l}
\texttt{semantic-daughter}(x,y) \stackrel{\forall}{\Longleftarrow} \\
\qquad y\textrm{DTRS} \sim \textit{head-adj-str}\ \land\ x \approx y\textrm{ADJ-DTR} \\
\texttt{semantic-daughter}(x,y) \stackrel{\forall}{\Longleftarrow} \\
\qquad \neg y\textrm{DTRS} \sim \textit{head-adj-str}\ \land\ x \approx y\textrm{HEAD-DTR}
\end{array}
$$

A.6 Control and Raising

Although we believe that the CONTROL PRINCIPLE and the RAISING PRINCIPLE should ultimately be stated as a part of a more comprehensive theory of linking, we provide here (for completeness) an RSRL formalization of the final versions of these principles, repeated (from Chapter 10) below.

(10.83) CONTROL PRINCIPLE (Polish; revised):

$$
\begin{array}{l}
(\begin{bmatrix} \textit{basic} \\ \ldots\ \textrm{ARG-ST}\ \boxed{0} \end{bmatrix} \land \\
\texttt{member}(\boxed{2}\textrm{XP}_{\boxed{1}},\boxed{0}) \land \\
\texttt{member}(\textrm{YP}[\textit{verb},\ \textrm{SUBJ}\ \langle \boxed{3}_{\boxed{1}} \rangle],\boxed{0})) \rightarrow (\boxed{2} = \boxed{3} \leftrightarrow \boxed{0} = \langle \boxed{2}, \ldots \rangle)
\end{array}
$$

(10.78) RAISING PRINCIPLE (Polish; revised):

If an element of a *basic*'s ARG-ST is not assigned a role in this *basic*'s CONTENT, then its *synsem* must be structure-shared with the *synsem* of some element of a lower ARG-ST.

Evidently, (10.83) is almost an RSRL formula; a more careful formalization is given in (A.40).

(A.40) $\forall x_0\ \forall x_1\ \forall x_2\ \forall x_3\ \forall y$ [
[: $\sim$ *basic*
$\wedge$: SS LOC CAT HEAD ARG-ST $\approx x_0$
$\wedge$ `member`(x_2,x_0)
$\wedge$ x_2ARG LOC CONT INDEX $\approx x_1$
$\wedge$ `member`(y,x_0)
$\wedge$ yARG LOC CAT HEAD $\sim$ *verbal*
$\wedge$ yARG LOC CAT VAL SUBJ FIRST $\approx x_3$
$\wedge$ x_3ARG LOC CONT INDEX $\approx x_1$] $\rightarrow$ [x_2ARG $\approx x_3$ARG $\leftrightarrow$ x_0FIRST $\approx x_2$]]

As to the RAISING PRINCIPLE (10.78), we propose below only a schematic formalization, leaving the relation `bears-role` undefined.

(A.41) $\forall x_0\ \forall x_1\ \forall x_2$ [
[: $\sim$ *basic*
$\wedge$ $x_0 \approx$: SS LOC CAT HEAD ARG-ST
$\wedge$ $x_1 \approx$: SS LOC CONT
$\wedge$ `member`(x_2,x_0)
$\wedge$ $\neg$`bears-role`(x_2,x_1)]
$\rightarrow$ $\exists y_1\ \exists y_2$ [
`lower-arg-st`(y_1,x_0)
$\wedge$ `member`(y_2,y_1)
$\wedge$ x_2ARG $\approx y_2$ARG]]

(A.42) `lower-arg-st`(y,x) $\overset{\forall}{\Longleftarrow}$
$\exists x_1\ \exists x_2$ [
`member`(x_1,x)
$\wedge$ $x_2 \approx x_1$ARG LOC CAT HEAD ARG-ST
$\wedge$ [$y \approx x_2 \vee$ `lower-arg-st`(y,x_2)]]

A.7 ARG-ST on Phrases?

As noted a number of times in the main body of this study, especially in Chapter 5, it is a controversial issue whether ARG-ST should be inherited from *word*s to *phrase*s. The advocates of this stance argue that various phenomena are difficult or even impossible to analyse without assuming ARG-ST on *phrase*s, while the opponents claim that the presence of the argument structure of a lexical item on all projections of this item endangers the restrictiveness (and, hence, explanatory force) of the theory: if ARG-ST is present on *phrase*s, then, say, a verb may be lexically specified as subcategorizing for an NP whose argument structure itself contains a dative NP. It is claimed that this kind of non-local subcategorization does not take place in natural languages.

For this reason, we sketch below a possible revision of our stance on ARG-ST on *phrase*s, upon which the value of ARG-ST is inherited only under very special circumstances.

Recall the parts of our analysis of case assignment in Polish which required ARG-ST on *phrase*s. First, in §5.4.1.2 we considered phrases consisting of a 'case marking' (i.e., non-predicative) preposition and a predicative AP/NP phrase, as in (5.378) (repeated below), and argued that the PP[*za*] must inherit ARG-ST from the preposition *za*, so that raising from the subject of the complement of *za* to the complement of the verb *uważać* 'consider' can be stated in the lexical entry of *uważać*, as in (5.406) (also repeated below).

(5.378)

Uważałem$_{1st,sg,masc}$	go	za	szczerego.
considered	him$_{acc}$	for	sincere$_{acc}$

'I considered him to be sincere.'

(5.406)
$$\begin{bmatrix} \textit{word} & \\ \text{PHON} & \text{uważać} \\ \text{ARG-ST} & \langle \text{NP}_{\boxed{1}}, \boxed{0}, \text{PP} \rangle \\ \text{CONT} & \begin{bmatrix} \textit{consider} & \\ \text{CONSIDERER} & \boxed{1} \\ \text{SOA-ARG} & \boxed{2} \end{bmatrix} \end{bmatrix}$$

Another case of ARG-ST on *phrase*s was considered in §5.4.3.2, which provided an HPSG analysis of examples such as (5.455)–(5.456), repeated below.

(5.455) a.

Kilka	drzew	było	wyrwane	z	ziemi.
a few$_{acc}$	trees$_{gen}$	be$_{3rd,sg,neut}$	torn$_{acc}$	from	earth

'A few trees were uprooted.'

b.

Kilka	drzew	było	wyrwanych	z	ziemi.
a few$_{acc}$	trees$_{gen}$	be$_{3rd,sg,neut}$	torn$_{gen}$	from	earth

'A few trees were uprooted.'

(5.456) a.

Te	pięć	kobiet	wydawało	się	bardzo	miłe.
these$_{acc}$	five$_{acc}$	women$_{gen}$	seemed$_{3rd,sg,neut}$	RM	very	nice$_{acc}$

'These five women seemed very nice.'

b.

Tych	pięć	kobiet	wydawało	się	bardzo	miłych.
these$_{gen}$	five$_{acc}$	women$_{gen}$	seemed$_{3rd,sg,neut}$	RM	very	nice$_{gen}$

'These five women seemed very nice.'

As these examples show, a phrase (here predicative) modifying a numeral phrase may agree either with the whole numeral phrase (as in the a. examples), or with the argument of the numeral (as in the b. examples). We built this optionality into the definition of the relation `case-agreement`, repeated below.

(5.466)
$$\texttt{case-agreement}(\boxed{1}\textit{case},\ \boxed{2}\textit{head}) \leftrightarrow (\boxed{2} = [\text{CASE } \boxed{1}] \vee \boxed{2} = \begin{bmatrix} \text{ARG-ST} & \langle [\text{CASE } \boxed{1}], \ldots \rangle \\ \text{NUM} & + \end{bmatrix})$$

Note that this relation requires ARG-ST to 'percolate' from numerals to their projections.

These are the only two phenomena we have seen apparently requiring ARG-ST on *phrase*s. What do they have in common?

One restriction on percolation of ARG-ST we could posit concerns the fact that, in both cases, only the first (and only) element of ARG-ST must be present on maximal projections. In fact, in many (but by no means all) phenomena discussed in the literature as requiring ARG-ST on *phrases*, only information about the subject is required on the maximal projection. Thus, instead of making the whole ARG-ST a *head* feature, we could posit a *head* attribute whose value would be structure-shared with the first element of ARG-ST.

Here, however, we will consider a more interesting alternative. One striking property that 'case marking' prepositions and numerals have in common is that they seem to be semantically empty, i.e., that they do not introduce their own CONTENT value. This is clear in case of 'case marking' prepositions, whose semantic contribution is none, but less clear in case of numerals, which seem to contribute a quantifier to the meaning of the NP they combine with.[18] Recall from Chapter 9 (cf. §9.3.2.2), though, that the information about newly introduced quantifiers is not a part of CONTENT now, but is reflected by the value of NEW-QS, appropriate for *words* (or just *basic* words), i.e., outside CONTENT. Thus, for example, the numeral *pięć* 'five' may be schematically represented as in (A.43):

$$\text{(A.43)} \quad \begin{bmatrix} \textit{word} \\ \text{PHON pięć} \\ \text{SS}|\text{LOC} \begin{bmatrix} \text{CONT } \boxed{0} \\ \text{CAT}|\text{ARG-ST } \langle[\text{CONT } \boxed{0}]\rangle \end{bmatrix} \\ \text{NEW-QS } \{5(\boxed{0})\} \end{bmatrix}$$

Thus, a hypothesis that presents itself is that only ARG-ST of semantically empty *words* percolates to their maximal projections.

One formalization of this hypothesis is that ARG-ST is an attribute appropriate to *category* (and not *head*, as assumed above), with an additional constraint setting the value of ARG-ST on a *phrase* to that of its head daughter, if this head daughter is semantically empty, and to the empty list, if it is not. Such a constraint is given in (A.44), with `sem-empty` defined in (A.45).

$$\begin{array}{ll} \text{(A.44)} & \forall x \; [\; x \approx \,{:}\text{HEAD-DTR} \;\rightarrow \\ & \quad [\; [\texttt{sem-empty}(x) \rightarrow {:}\text{SS LOC CAT ARG-ST} \approx x\text{SS LOC CAT ARG-ST}] \\ & \quad \wedge \; [\neg\texttt{sem-empty}(x) \rightarrow {:}\text{SS LOC CAT ARG-ST} \sim \textit{elist}] \;]\;] \end{array}$$

$$\begin{array}{ll} \text{(A.45)} & \texttt{sem-empty}(x) \stackrel{\forall}{\Longleftarrow} \\ & \quad \exists y \; \exists z \; [\\ & \qquad y \approx x\text{SS LOC CAT ARG-ST} \\ & \qquad \wedge \; \texttt{member}(z, y) \\ & \qquad \wedge \; z\text{ARG LOC CONT} \approx x\text{SS LOC CONT} \;] \end{array}$$

Of course, having ARG-ST as a *category* attribute requires modifying many of the constraints proposed in the previous sections. This is what we will do next.

Basic Assumptions Apart from making ARG-ST appropriate for *category* instead of (*substantive*) *head*, the only modification required in §A.2 concerns the VERB AGREEMENT PRINCIPLE. (A.46) below should replace (A.5) above.

[18] See in this context the discussion at the end of §5.4.3.2.

(A.46) $\forall x\ [$
$[x \sim \mathit{word}$
$\wedge\ x\textsc{ss loc cat head} \sim \mathit{personal}]$
$\rightarrow$
$[\ [\neg x\textsc{ss loc cat arg-st first loc cat head agr case} \sim \mathit{nom}$
$\wedge\ x\textsc{ss loc cat head agr person} \sim \mathit{third}$
$\wedge\ x\textsc{ss loc cat head agr gender} \sim \mathit{neut}$
$\wedge\ x\textsc{ss loc cat head agr number} \sim \mathit{sg}]$
$\vee$
$[x\textsc{ss loc cat arg-st first loc cat head agr case} \sim \mathit{nom}$
$\wedge\ x\textsc{ss loc cat head agr person} \approx$
$x\textsc{ss loc cat arg-st first loc cont index person}$
$\wedge\ x\textsc{ss loc cat head agr gender} \approx$
$x\textsc{ss loc cat arg-st first loc cont index gender}$
$\wedge\ x\textsc{ss loc cat head agr number} \approx$
$x\textsc{ss loc cat arg-st first loc cont index number}]\ ]\ ]$

Case Assignment As to constraints proposed in §A.3, (A.11), responsible for the RAISED marking, should be modified as in (A.47).[19]

(A.47) $: \sim \mathit{unembedded\text{-}sign}$
$\rightarrow$
$\forall x_0 \forall x_1 \forall x_2 \forall x_3 \forall x_4 [$
$[x_0\textsc{head} \approx x_1 \wedge x_0\textsc{arg-st} \approx x_2 \wedge \texttt{member(}x_3\texttt{,}x_2\texttt{)} \wedge x_3\textsc{arg} \approx x_4]$
$\rightarrow$
$[x_3\textsc{raised} \sim +$
$\leftrightarrow$
$\exists x_5 \exists x_6 \exists x_7 \exists x_8$
$[x_6\textsc{arg-st} \approx x_5 \wedge \texttt{member(}x_7\texttt{,}x_5\texttt{)} \wedge x_7\textsc{arg} \approx x_4$
$\wedge\ \texttt{member(}x_8\texttt{,}x_5\texttt{)} \wedge x_8\textsc{arg loc cat head} \approx x_1]]]]$

Moreover, the constraints (A.16)–(A.22), responsible for case assignment in Polish, must be reformulated as constraints on *category*:

(A.48) $\forall x\ [$
$[: \textsc{head} \sim \mathit{impersonal}$
$\wedge\ : \textsc{arg-st first} \approx x$
$\wedge\ \texttt{str-cfc(}x\texttt{)}]\ \rightarrow\ x\textsc{arg loc cat head agr case} \sim \mathit{cless}\ ]$

(A.49) $\forall x\ [$
$[: \textsc{head} \sim \mathit{personal}$
$\wedge\ : \textsc{arg-st first} \approx x$
$\wedge\ \texttt{str-cfc(}x\texttt{)}$
$\wedge\ x\textsc{arg loc cat head} \sim \mathit{noun}]\ \rightarrow\ x\textsc{arg loc cat head agr case} \sim \mathit{snom}\ ]$

[19]The only change consists in replacing 'x_1ARG-ST' with 'x_0ARG-ST'.

(A.50) $\forall x$ [
$[:\text{HEAD} \sim \textit{personal}$
$\wedge :\text{ARG-ST FIRST} \approx x$
$\wedge$ `str-cfc(`x`)`
$\wedge\ x\text{ARG LOC CAT HEAD} \sim \textit{numeral}] \rightarrow x\text{ARG LOC CAT HEAD AGR CASE} \sim \textit{sacc}$]

(A.51) $\forall x\ \forall y$ [
$[:\text{HEAD} \sim \textit{verbal}$
$\wedge :\text{HEAD NEG} \sim -$
$\wedge :\text{ARG-ST REST} \approx y$
$\wedge$ `member(`x`,`y`)`
$\wedge$ `str-cfc(`x`)`$] \rightarrow x\text{ARG LOC CAT HEAD AGR CASE} \sim \textit{sacc}$]

(A.52) $\forall x\ \forall y$ [
$[:\text{HEAD} \sim \textit{verbal}$
$\wedge :\text{HEAD NEG} \sim +$
$\wedge :\text{ARG-ST REST} \approx y$
$\wedge$ `member(`x`,`y`)`
$\wedge$ `str-cfc(`x`)`
$\wedge\ x\text{ARG LOC CONT INDEX} \sim \textit{ref}] \ \rightarrow\ x\text{ARG LOC CAT HEAD AGR CASE} \sim \textit{sgen}$]

(A.53) $\forall x\ \forall y$ [
$[:\text{HEAD} \sim \textit{verbal}$
$\wedge :\text{HEAD NEG} \sim +$
$\wedge :\text{ARG-ST REST} \approx y$
$\wedge$ `member(`x`,`y`)`
$\wedge$ `str-cfc(`x`)`
$\wedge\ x\text{ARG LOC CONT INDEX} \sim \textit{non-ref}]$
$\rightarrow$
$[x\text{ARG LOC CAT HEAD AGR CASE} \sim \textit{sacc}$
$\vee\ x\text{ARG LOC CAT HEAD AGR CASE} \sim \textit{sgen}]$]

(A.54) $\forall x$ [
$[:\text{HEAD} \sim \textit{preposition}$
$\wedge :\text{ARG-ST FIRST} \approx x$
$\wedge :\text{ARG-ST REST} \sim \textit{elist}$
$\wedge$ `str-cfc(`x`)`$] \ \rightarrow\ x\text{ARG LOC CAT HEAD AGR CASE} \sim \textit{sacc}$]

A similar modification is needed in No Raising Across Negation:

(A.55) $\forall x\ \forall y$ [
$[:\text{HEAD} \sim \textit{verbal}$
$\wedge :\text{HEAD NEG} \sim +$
$\wedge :\text{ARG-ST REST} \approx y$
$\wedge$ `member(`x`,`y`)`$] \ \rightarrow$ `raised-(`x`)`]

Case Agreement The definition of `case-agreement` must be changed so that `case-agreement` holds between a *case* object and a *category* (instead of *head*) object:

(A.56) $\texttt{case-agreement}(x,y) \overset{\forall}{\Longleftarrow}$
$y\text{HEAD AGR CASE} \approx x$
$\texttt{case-agreement}(x,y) \overset{\forall}{\Longleftarrow}$
$y\text{ARG-ST FIRST ARG LOC CAT HEAD AGR CASE} \approx x$
$\land\ y\text{HEAD} \sim \textit{numeral}$

(A.57) ATTRIBUTIVE CASE AGREEMENT:

$\forall x\ \forall y\ [$
$[:\text{AGR CASE} \approx x$
$\land\ :\text{MOD LOC CAT} \approx y$
$\land\ y\text{HEAD} \sim \textit{cased}]\ \ \rightarrow\ \ \texttt{case-agreement}(x,y)\ ]$

(A.58) PREDICATIVE CASE (NON-)AGREEMENT:

$\forall x\ \forall y\ \forall z\ [$
$[:\text{VAL SUBJ FIRST} \approx x$
$\land\ :\text{HEAD AGR CASE} \approx y$
$\land\ x\text{RAISED} \sim +$
$\land\ x\text{ARG LOC CAT} \approx z]$
$\rightarrow$
$[\texttt{case-agreement}(y,z)$
$\lor\ [z\text{HEAD AGR CASE} \sim \textit{str}\ \land\ y \sim \textit{lins}]]\ ]$

'Adjuncts-as-Complements' A minor change is needed in the constraint on *ad-deriv* objects:

(A.59) $: \sim \textit{adj-deriv} \rightarrow$
$\exists x_0\ \exists x_1\ \exists y\ [$
$:\text{STEM SS LOC CAT ARG-ST} \approx x_1$
$\land\ :\text{STEM SS} \approx x_0\text{FIRST ARG LOC CAT HEAD MOD}$
$\land\ :\text{SS LOC CONT} \approx x_0\text{FIRST ARG LOC CONT}$
$\land\ \texttt{append}(x_1,x_0,y)$
$\land\ :\text{SS LOC CAT ARG-ST} \approx y\ ]$

Interestingly, Desc_3 in our analysis of quantification describes exactly the semantically empty elements satisfying the relation `sem-empty`, so (A.32) may be simplified to (A.60).[20]

(A.60) $: \sim \textit{basic} \rightarrow\ [$
$\exists y_0\ \exists y_1\ \exists x_1\ \exists x_2\ \exists x_3\ \exists x_4\ \exists x_5\ [$ (Desc_{12})
$y_0 \approx :\text{SS LOC CAT ARG-ST}$
$\land\ \texttt{qs-union}(y_0,y_1)$
$\land\ x_5 \approx :\text{NEW-QS}$
$\land\ \texttt{union}(y_1,x_5,x_1)$
$\land\ [\ [\neg:\text{SS LOC CONT} \sim \textit{psoa}\ \land\ :\text{SS LOC CONT QSTORE} \approx x_1]$

[20]Strictly speaking, '`sem-empty(:)`' (cf. Desc_3) is an abbreviation for '$\exists x\ [x \approx :\ \land\ \texttt{sem-empty}(x)]$'.

$$
\begin{array}{l}
\quad\quad \vee\ [\!:\text{SS LOC CONT} \sim \textit{psoa} \\
\quad\quad\quad \wedge\ x_2 \approx\ :\text{SS LOC CONT QSTORE} \\
\quad\quad\quad \wedge\ x_3 \approx\ :\text{SS LOC CONT QUANTS} \\
\quad\quad\quad \wedge\ \texttt{list-to-set(}x_3\texttt{,}x_4\texttt{)} \\
\quad\quad\quad \wedge\ \texttt{union(}x_2\texttt{,}x_4\texttt{)}]\ ]\ ] \\
\vee \\
\quad \texttt{sem-empty(:)}\ ]
\end{array}
\quad (\mathrm{Desc}_3)
$$

Another, less trivial modification is required in the definition of `raised`. Since ARG-ST on a *phrase* is no longer guaranteed to contain the elements present on the corresponding *word*, `raised` must be defined in terms of VALENCE attributes:

(A.61)
$$
\begin{array}{l}
\texttt{raised(}x\texttt{,}z\texttt{)} \overset{\forall}{\Longleftarrow} \\
\quad \exists y\ \exists y_1\ \exists y_2\ \exists y_3\ [\\
\quad\ \texttt{member(}y\texttt{,}z\texttt{)} \\
\quad\ \wedge\ y\text{ARG LOC CAT VAL SUBJ} \approx y_1 \\
\quad\ \wedge\ y\text{ARG LOC CAT VAL SPR} \approx y_2 \\
\quad\ \wedge\ y\text{ARG LOC CAT VAL COMPS} \approx y_3 \\
\quad\ \wedge\ [\texttt{member(}x\texttt{,}y_1\texttt{)} \vee \texttt{member(}x\texttt{,}y_2\texttt{)} \vee \texttt{member(}x\texttt{,}y_3\texttt{)}]\ ]
\end{array}
$$

Control and Raising Finally, the slight modification of the CONTROL PRINCIPLE is given in (A.62).

(A.62)
$$
\begin{array}{l}
\forall x_0\ \forall x_1\ \forall x_2\ \forall x_3\ \forall y\ [\\
\quad [\!:\sim \textit{basic} \\
\quad \wedge\ :\text{SS LOC CAT ARG-ST} \approx x_0 \\
\quad \wedge\ \texttt{member(}x_2\texttt{,}x_0\texttt{)} \\
\quad \wedge\ x_2\text{ARG LOC CONT INDEX} \approx x_1 \\
\quad \wedge\ \texttt{member(}y\texttt{,}x_0\texttt{)} \\
\quad \wedge\ y\text{ARG LOC CAT HEAD} \sim \textit{verbal} \\
\quad \wedge\ y\text{ARG LOC CAT VAL SUBJ FIRST} \approx x_3 \\
\quad \wedge\ x_3\text{ARG LOC CONT INDEX} \approx x_1]\ \rightarrow\ [x_2\text{ARG} \approx x_3\text{ARG}\ \leftrightarrow\ x_0\text{FIRST} \approx x_2]\ ]
\end{array}
$$

On the other hand, a substantial change is required to the RAISING PRINCIPLE, whose natural language version is repeated below:

(10.78) RAISING PRINCIPLE (Polish; revised):

> If an element of a *basic*'s ARG-ST is not assigned a role in this *basic*'s CONTENT, then its *synsem* must be structure-shared with the *synsem* of some element of a lower ARG-ST.

In §A.6, we formalized this principle more or less directly as a constraint on *basic* objects (cf. (A.41)). We could do that because 'lower ARG-ST' were directly accessible on elements of such *basic* objects' ARG-STs. Now, however, that ARG-STs do not in general percolate to maximal projections, we re-formalize this principle as a global constraint:

(A.63)
$$
\begin{array}{l}
:\sim \textit{unembedded-sign} \rightarrow \\
\quad \forall x_0\ \forall x_1\ \forall x_2\ \forall y\ [\\
\quad\quad [y \sim \textit{basic} \\
\quad\quad \wedge\ x_0 \approx y\text{SS LOC CAT ARG-ST} \\
\quad\quad \wedge\ x_1 \approx y\text{SS LOC CONT} \\
\quad\quad \wedge\ \texttt{member}(x_2, x_0) \\
\quad\quad \wedge\ \neg\texttt{bears-role}(x_2, x_1)] \\
\quad\quad \rightarrow\ \exists y_1\ \exists y_2\ [\\
\quad\quad\quad \texttt{lower-arg-st}(y_1, x_0) \\
\quad\quad\quad \wedge\ \texttt{member}(y_2, y_1) \\
\quad\quad\quad \wedge\ x_2\text{ARG} \approx y_2\text{ARG}]\ ]
\end{array}
$$

(A.64)
$$
\begin{array}{l}
\texttt{lower-arg-st}(y, x) \overset{\forall}{\Longleftarrow} \\
\quad \exists x_1\ \exists x_2\ \exists x_3\ [\\
\quad\quad \texttt{member}(x_1, x) \\
\quad\quad \wedge\ x_2 \sim \textit{word} \\
\quad\quad \wedge\ x_2\text{SS LOC CAT HEAD} \approx x_1\text{ARG LOC CAT HEAD} \\
\quad\quad \wedge\ x_2\text{SS LOC CAT AGR-ST} \approx x_3 \\
\quad\quad \wedge\ [y \approx x_3 \vee \texttt{lower-arg-st}(y, x_3)]\ ]
\end{array}
$$

This ends the sketch of the revision of our RSRL formalization, as proposed in the previous sections, necessitated by a possible revision of our stance on ARG-ST on *phrase*s.

Bibliography

Abeillé, A. and Godard, D. (1997). The syntax of French negative adverbs. In D. Forget, P. Hirschbühler, F. Martineau, and M.-L. Rivero, editors, *Negation and Polarity*, volume 155 of *Current Issues in Linguistic Theory*, pages 1–27. Benjamins, Amsterdam.

Abeillé, A., Godard, D., Miller, P., and Sag, I. A. (1998a). French bounded dependencies. In Balari and Dini (1998), pages 1–54.

Abeillé, A., Godard, D., and Sag, I. A. (1998b). Two kinds of composition in French complex predicates. In E. Hinrichs, A. Kathol, and T. Nakazawa, editors, *Complex Predicates in Nonderivational Syntax*, volume 30 of *Syntax and Semantics*, pages 1–41. Academic Press, New York.

Abney, S. (1996). Stochastic attribute-value grammars. Unpublished manuscript, Universität Tübingen.

Aitchison, J. (1994). *Words in the Mind: An Introduction to the Mental Lexicon*. Blackwell, Oxford, second edition.

Akmajian, A. (1973). The role of focus in the interpretation of anaphoric expressions. In S. R. Anderson and P. Kiparsky, editors, *A Festschrift for Morris Halle*, pages 215–226. Holt, Rinehart and Winston, New York.

Altmann, G. T. M. (1997). *The Ascent of Babel*. Oxford University Press, Oxford.

Anderson, S. R. (1992). *A-Morphous Morphology*. Number 62 in Cambridge Studies in Linguistics. Cambridge University Press, Cambridge.

Andrejewicz, U. (1988). O związkach składniowych wołacza w zdaniach współczesnej polszczyzny. *Polonica*, **XIII**, 123–130.

Andrejewicz, U. (1996). *Polskie Zaimki Rzeczowne w Ujęciu Gramatycznym i Leksykograficznym*. Ph.D. thesis, Uniwersytet Warszawski, Filia w Białymstoku.

Andrews, A. D. (1971a). Against conjunct movement. *Linguistic Inquiry*, **2**, 250–252.

Andrews, A. D. (1971b). Case agreement of predicate modifiers in Ancient Greek. *Linguistic Inquiry*, **2**, 127–151.

Andrews, A. D. (1982). The representation of case in modern Icelandic. In Bresnan (1982b), pages 427–503.

Andrews, A. D. (1990). Case structures and control in Modern Icelandic. In J. Maling and A. Zaenen, editors, *Modern Icelandic Syntax*, pages 187–234. Academic Press, New York.

Aranovich, R. (1993). Negative concord in Spanish and *in-situ* licensing. In E. Duncan, D. Farkas, and P. Spaelti, editors, *Proceedings of Twelfth West Coast Conference on Formal Linguistics*.

Avgustinova, T. and Oliva, K. (1996). Unbounded dependencies in HPSG without traces or lexical rules. Technical Report CLAUS 70, Universität des Saarlandes, Saarbrücken.

Avgustinova, T., Skut, W., and Uszkoreit, H. (1999). Typological similarities in HPSG: A case study on Slavic diathesis. In Borsley and Przepiórkowski (1999), pages 1–28.

Babby, L. (1980a). *Existential Sentences and Negation in Russian*. Karoma Publishers, Ann Arbor.

Babby, L. (1980b). The syntax of surface case marking. In W. Harbert and J. Herschensohn, editors, *Cornell Working Papers in Linguistics*, volume 1, pages 1–32. Department of Modern Languages and Linguistics, Cornell University.

Babby, L. (1984). Case conflicts and their resolution. In Harbert (1984), pages 1–21.

Babby, L. (1985). Prepositional quantifiers and the direct case condition in Russian. In M. S. Flier and R. D. Brecht, editors, *Issues in Russian Morphosyntax*, pages 91–117. Slavica Publishers, Columbus, Ohio.

Babby, L. H. (1986). The locus of case assignment and the direction of percolation: Case theory and Russian. In Brecht and Levine (1986b), pages 170–219.

Babby, L. H. (1987). Case, pre-quantifiers, and discontinuous agreement in Russian. *Natural Language and Linguistic Theory*, **5**, 91–138.

Babby, L. H. (1988). Noun Phrase internal case agreement in Russian. In M. Barlow and C. A. Ferguson, editors, *Agreement in Natural Language: Approaches, Theories, Descriptions*, pages 287–304. CSLI Publications, Stanford.

Babby, L. H. (1998). Subject control as direct predication: Evidence from Russian. In Bošković *et al.* (1998), pages 17–37.

Badia, T. (1998). Prepositions in Catalan. In Balari and Dini (1998), pages 109–149.

Bailyn, J. F. (1995). Configurational case assignment in Russian syntax. *The Linguistic Review*, **12**, 315–360.

Bailyn, J. F. (1997). Genitive of negation is obligatory. In Browne *et al.* (1997), pages 84–114.

Bailyn, J. F. and Citko, B. (1999). Case and agreement in Slavic predicates. In Dziwirek *et al.* (1999), pages 17–37.

Bailyn, J. F. and Rubin, E. J. (1991). The unification of instrumental Case assignment in Russian. In W. Harbert and A. J. Toribo, editors, *Cornell Working Papers in Linguistics*, volume 9, pages 99–126. Department of Modern Languages and Linguistics, Cornell University.

Bąk, P. (1984). *Gramatyka Języka Polskiego*. Wiedza Powszechna, Warszawa, fourth edition.

Baker, C. L. (1970). Notes on the description of English questions: The role of an abstract Q-morpheme. *Foundations of Language*, **6**, 197–219.

Baker, C. L. (1978). *Introduction to Generative-Transformational Syntax*. Prentice-Hall, Englewood Cliffs, New Jersey.

Balari, S. and Dini, L., editors (1998). *Romance in HPSG*. Number 75 in CSLI Lecture Notes. CSLI Publications, Stanford.

Banyś, W., Bednarczuk, L., and Karolak, S., editors (1999). *Studia Lingwistyczne Ofiarowane Profesorowi Kazimierzowi Polańskiemu na 70-lecie Jego Urodzin*, volume 1775 of *Prace Naukowe Uniwersytetu Śląskiego w Katowicach*. Wydawnictwo Uniwersytetu Śląskiego, Katowice.

Bartnicka, B. and Satkiewicz, H. (1990). *Gramatyka Języka Polskiego dla Cudzoziemców*. Wiedza Powszechna, Warszawa.

Bartnicka-Dąbkowska, B., Jaworski, M., and Sinielnikoff, R. (1972). *Gramatyka Opisowa Języka Polskiego z Ćwiczeniami*, volume 2: Fleksja, Składnia. Państwowe Zakłady Wydawnictw Szkolnych, Warszawa.

Baxter, D. P. (1999a). Conjunctive semantics for semantically transparent adverbials. In Webelhuth *et al.* (1999), pages 317–330.

Baxter, D. P. (1999b). *English Goal Infinitives*. Ph.D. thesis, University of Illinois at Urbana-Champaign.

Bellert, I. (1977). On semantic and distributional properties of sentential adverbs. *Linguistic Inquiry*, **8**(2), 337–251.

Bender, E. and Flickinger, D. (1998). Looks like a Trojan horse got into the argument structure. In Bouma *et al.* (1998b), pages 217–226.

Bender, E. and Flickinger, D. (1999). Diachronic evidence for extended argument structure. In Bouma *et al.* (1999a). Forthcoming.

Benni, T., Łoś, J., Nitsch, K., Rozwadowski, J., and Ułaszyn, H. (1923). *Gramatyka Języka Polskiego*. Polska Akademia Umiejętności, Warszawa.

Billings, L. and Maling, J. (1995a). Accusative-assigning participial *-no*/*-to* constructions in Ukrainian, Polish, and neighboring languages: An annotated bibliography. Part 1: *A–M*. *Journal of Slavic Linguistics*, **3**(1), 177–217.

Billings, L. and Maling, J. (1995b). Accusative-assigning participial *-no*/*-to* constructions in Ukrainian, Polish, and neighboring languages: An annotated bibliography. Part 2: *N–Z*. *Journal of Slavic Linguistics*, **3**(2), 396–430.

Bird, S. (1995). *Computational Phonology: A Constraint-Based Approach*. Cambridge University Press, Cambridge.

Bird, S. and Klein, E. (1993). Enriching HPSG phonology. Research Paper EUCCS/RP-56, Centre for Cognitive Science, University of Edinburgh.

Bird, S. and Klein, E. (1994). Phonological analysis in typed feature systems. *Computational Linguistics*, **20**, 455–491.

Blake, B. J. (1994). *Case*. Cambridge Textbooks in Linguistics. Cambridge University Press, Cambridge.

Błaszczak, J. (1998a). The riddle of n-words in Polish: quantificational versus nonquantificational, universal versus existential. Paper delivered at the conference on negation, Salford, Great Britain.

Błaszczak, J. (1998b). Some reflections on the interaction between indefinites and the clause. In M. Giger and B. Wiemer, editors, *Die Welt der Slaven*, volume 2 of *Beiträge der Europäischen Slavistischen Linguistik (POLYSLAV)*, pages 55–65. Verlag Otto Sagner, Munich.

Błaszczak, J. (1999). Towards a binding analysis of negative polarity items in Polish. In *Proceedings of the Second European Conference on Formal Description of Slavic Languages, Potsdam, Germany, November 20–22, 1997*. Draft. To appear.

Bobrowski, I. (1988). *Gramatyka Generatywno-Transformacyjna (TG) a Uogólniona Gramatyka Struktur Frazowych (GPSG)*. Prace Habilitacyjne. Ossolineum, Wrocław.

Bobrowski, I. (1995). *Gramatyka Opisowa Języka Polskiego (Zarys Modelu Generatywno-Transformacyjnego)*, volume I: Struktury Wyjściowe. Wyższa Szkoła Pedagogiczna im. Jana Kochanowskiego, Kielce.

Bobrowski, I. (1998). *Gramatyka Opisowa Języka Polskiego (Zarys Modelu Generatywno-Transformacyjnego)*, volume II: Od Struktur Wyjściowych do Tekstu. Wyższa Szkoła Pedagogiczna im. Jana Kochanowskiego, Kielce.

Bogusławski, A. (1966). *Semantyczne pojęcie liczebnika i jego morfologia w języku rosyjskim*. Ossolineum, Wrocław.

Bolinger, D. (1978). Asking more than one thing at a time. In H. Hiż, editor, *Questions*. Reidel, Dordrecht.

Bondaruk, A. (1996). On parasitic gaps in Polish. *Papers and Studies in Contrastive Linguistics*, **XXXI**, 111–125.

Bondaruk, A. (1998). The status of *niż* in Polish comparative clauses. In P. Stalmaszczyk, editor, *Projections and Mapping: Studies in Syntax*, volume 5 of *PASE Studies and Monographs*, pages 13–26. Folium, Lublin.

Borovikoff, N. L. (1997). Negated adjunct phrases are REALLY the Genitive of Negation. In Lindseth and Franks (1997), pages 67–85.

Borsley, R. D. (1983a). A note on preposition stranding. *Linguistic Inquiry*, pages 338–343.

Borsley, R. D. (1983b). A note on the generalized left branch condition. *Linguistic Inquiry*, **14**, 169–174.

Borsley, R. D. (1988). A note on impersonal passives. *Journal of Linguistics*, **24**(2), 483–487.

Borsley, R. D. (1991). *Syntactic Theory: A Unified Approach.* Edward Arnold, London.

Borsley, R. D. (1999a). *Syntactic Theory: A Unified Approach.* Edward Arnold, London, second edition.

Borsley, R. D. (1999b). Weak auxiliaries, complex verbs and inflected complementizers. In Borsley and Przepiórkowski (1999), pages 29–59.

Borsley, R. D. and Przepiórkowski, A., editors (1999). *Slavic in Head-Driven Phrase Structure Grammar.* CSLI Publications, Stanford.

Borsley, R. D. and Rivero, M. L. (1994). Clitic auxiliaries and incorporation in Polish. *Natural Language and Linguistic Theory*, **12**, 373–422.

Bošković, Ž., Franks, S., and Snyder, W., editors (1998). *Annual Workshop on Formal Approaches to Slavic Linguistics: The Connecticut Meeting 1997*, volume 43 of *Michigan Slavic Materials*, Ann Arbor. Michigan Slavic Publications.

Bouma, G., Malouf, R., and Sag, I. (1997). Satisfying constraints on extraction and adjunction. Draft of July 1, 1997.

Bouma, G., Malouf, R., and Sag, I. (1998a). Adjunct scope. Preliminary Draft of May, 1998.

Bouma, G., Kruijff, G.-J. M., and Oehrle, R. T., editors (1998b). *Proceedings of the Joint Conference on Formal Grammar, Head-Driven Phrase Structure Grammar, and Categorial Grammar, 14–16 August 1998, Saarbrücken.*

Bouma, G., Malouf, R., and Sag, I. (1998c). A unified theory of complement, adjunct, and subject extraction. In Bouma *et al.* (1998b), pages 83–97.

Bouma, G., Hinrichs, E., Kruijff, G.-J. M., and Oehrle, R. T., editors (1999a). *Constraints and Resources in Natural Language Syntax and Semantics.* CSLI Publications, Stanford. Forthcoming.

Bouma, G., Malouf, R., and Sag, I. (1999b). Satisfying constraints on extraction and adjunction. Unpublished manuscript.

Bouton, L. F. (1969). Identity constraints on the do-so rule. *Papers in Linguistics*, **1**(2), 231–247.

Bowers, J. S. (1984). On the autonomy of inflectional morphology. In Harbert (1984), pages 23–41.

Bratt, E. O. (1990). The French causative construction in HPSG. Unpublished manuscript.

Bratt, E. O. (1996). *Argument Composition and the Lexicon: Lexical and Periphrastic Causatives in Korean.* Ph.D. thesis, Stanford University.

Brecht, R. D. and Levine, J. S. (1986a). Case and meaning. In Brecht and Levine (1986b), pages 17–34.

Brecht, R. D. and Levine, J. S., editors (1986b). *Case in Slavic*. Slavica Publishers, Columbus, Ohio.

Bresnan, J. (1971). Note on the notion 'identity of sense anaphora'. *Linguistic Inquiry*, **2**, 589–597.

Bresnan, J. (1982a). Control and complementation. In Bresnan (1982b), pages 283–390.

Bresnan, J., editor (1982b). *The Mental Representation of Grammatical Relations*. MIT Press Series on Cognitive Theory and Mental Representation. The MIT Press, Cambridge, Mass.

Bresnan, J. (1982c). Polyadicity. In Bresnan (1982b), pages 149–172.

Bresnan, J. (1994). Locative inversion and the architecture of universal grammar. *Language*, **70**(1), 72–131.

Bresnan, J. (1995). Lexical-functional syntax. ESSLLI'95 Lecture Notes.

Brew, C. (1993). Adding preferences to CUF. In J. Dörre, editor, *Computational Aspects of Constraint-Based Linguistic Description I*, volume R1.2.A of *DYANA-2*, pages 56–69, Centre for Cognitive Science, University of Edinburgh.

Brown, S. (1995). Scope of negation: Genitive of negation and polarity in Russian. *Proceedings of the Formal Linguistics Society of Mid-America*, **6**(2), 13–24.

Brown, S. (1996). *The Syntax of Negation in Russian*. Ph.D. thesis, Indiana University.

Brown, S. (1999). *The Syntax of Negation in Russian: A Minimalist Approach*. CSLI Publications, Stanford.

Brown, S. and Franks, S. (1995). Asymmetries in the scope of Russian negation. *Journal of Slavic Linguistics*, **3**(2), 239–87.

Browne, W., Dornisch, E., Kondrshova, N., and Zec, D., editors (1997). *Annual Workshop on Formal Approaches to Slavic Linguistics, The Cornell Meeting 1995*, volume 39 of *Michigan Slavic Materials*, Ann Arbor. Michigan Slavic Publications.

Bugajski, M. (1983). *Morfem* nie *we Współczesnym Języku Polskim i Zasadach Pisowni*, volume 647 of *Acta Universitatis Wratislaviensis*. Wydawnictwo Uniwersytetu Wrocławskiego, Wrocław.

Büntig, K.-D. (1989). *Wstęp do Lingwistyki*. Państwowe Wydawnictwo Naukowe, Warszawa. Translated from German *Einführung in die Linguistik*, 1981, Athenäum Verlag.

Bußmann, H. (1990). *Lexikon der Sprachwissenschaft*. Alfred Kröner Verlag, Stuttgart.

Butt, M. (1995). *The Structure of Complex Predicates in Urdu*. CSLI Publications, Stanford.

Butt, M. and King, T. H. (1991). Semantic case in Urdu. In L. M. Dobrin, L. Nichols, and R. M. Rodriguez, editors, *Papers from the 27th Regional Meeting of the Chicago Linguistic Society*, pages 31–46, Chicago.

Butt, M. and King, T. H. (1999). The status of case. Unpublished manuscript, Xerox PARC and University of Konstanz, version of July 1999.

Buttler, D., Kurkowska, H., and Satkiewicz, H. (1971). *Kultura Języka Polskiego: Zagadnienia Poprawności Gramatycznej*. Państwowe Wydawnictwo Naukowe, Warszawa.

Calcagno, M. (1995). Interpreting lexical rules. In *Proceedings of ESSLLI7 Conference on Formal Grammar*, Barcelona, Spain. Universidad Politecnica de Catalunya.

Calcagno, M. and Kasper, B. (1997). Adjunct scope, linearization and the adjunct-complement distinction. An Abstract.

Calcagno, M. and Pollard, C. (1997). Argument structure, structural case, and French causatives. Paper deliverd during the 4th International Conference on HPSG, 18–20 July 1997, Ithaca, New York.

Calcagno, M. and Pollard, C. (1999). The role of argument structure in the interaction between reflexives and causatives in French. In *Proceedings of the ESSLLI-99 Workshop on Lexical Semantics and Linking in Constraint-based Theories*, pages 96–110, Utrecht, Holland. University of Utrecht.

Calcagno, M., Levine, R. D., and Hukari, T. E. (1999). Parasitic gaps in English: Some strange cases and their theoretical implications. In P. W. Culicover and P. M. Postal, editors, *Parasitic Gaps*. The MIT Press, Cambridge, Mass. Forthcoming.

Cetnarowska, B. (1998). Passive event nominals in English. In E. Gussmann and B. Szymanek, editors, *PASE Papers in Literature, Language and Culture*, pages 463–473. The University Press of the Catholic University of Lublin, Lublin.

Chao, W. (1987). *On Ellipsis*. Ph.D. thesis, University of Massachusetts.

Chomsky, N. (1957). *Syntactic Structures*. Mouton, The Hague.

Chomsky, N. (1959). Review of Skinner (1957). *Language*, **35**, 26–58.

Chomsky, N. (1970). Remarks on nominalizations. In R. A. Jacobs and P. S. Rosenbaum, editors, *Readings in English Transformational Grammar*, pages 184–221. Ginn, Waltham, Mass.

Chomsky, N. (1980). On binding. *Linguistic Inquiry*, **11**(1), 1–46.

Chomsky, N. (1981). *Lectures on Government and Binding*. Foris, Dordrecht.

Chomsky, N. (1982). *Concepts and Consequences of the Theory of Government and Binding*. The MIT Press, Cambridge, Mass.

Chomsky, N. (1986a). *Knowledge of Language: Its Nature, Origin, and Use*. Praeger, Westport.

Chomsky, N. (1986b). *Barriers*, volume 13 of *Linguistic Inquiry Monographs*. The MIT Press, Cambridge, Mass.

Chomsky, N. (1992). A minimalist program for linguistic theory. MIT Occasional Papers in Linguistics 1, Massachusetts Institute of Technology.

Chomsky, N. (1993). A minimalist program for linguistic theory. In K. Hale and S. J. Keyser, editors, *The View from Building 20*, volume 24 of *Current Studies in Linguistics*, pages 1–52. The MIT Press, Cambridge, Mass.

Chomsky, N. (1995a). Bare phrase structure. In Webelhuth (1995a), pages 383–439.

Chomsky, N. (1995b). Categories and transformations. In Chomsky (1995c), pages 219–394.

Chomsky, N. (1995c). *The Minimalist Program*, volume 28 of *Current Studies in Linguistics*. The MIT Press, Cambridge, Mass.

Chomsky, N. and Lasnik, H. (1995). Principles and parameters. In Chomsky (1995c), pages 13–127.

Chung, C. (1995). *A Lexical Approach to Word Order Variation in Korean*. Ph.D. thesis, Ohio State University.

Chvany, C. V. (1986). Jakobson's fourth and fifth dimensions: On reconciling the cube model of case meanings with the two-dimensional matrices for case forms. In Brecht and Levine (1986b), pages 107–129.

Cichocki, W. (1983). Multiple wh-questions in Polish: A two-comp analysis. *Toronto Working Papers in Linguistics*, **4**, 53–71.

Cinque, G. (1990). *Types of A'-Dependencies*. The MIT Press, Cambridge, Mass.

Comrie, B. (1974). The second dative: A transformational approach. In R. D. Brecht and C. V. Chvany, editors, *Slavic Transformational Syntax*, volume 10 of *Michigan Slavic Materials*. Department of Slavic Languages and Literatures, University of Michigan, Ann Arbor.

Comrie, B. (1986). On delimiting cases. In Brecht and Levine (1986b), pages 86–106.

Copestake, A. (1992). The representation of lexical semantic information. Cognitive Science Research Paper CSRP 280, University of Sussex.

Copestake, A., Flickinger, D., and Sag, I. A. (1997). Minimal recursion semantics: An introduction. Unpublished manuscript.

Corbett, G. (1983). *Hierarchies, Targets and Controllers: Agreement Patterns in Slavic*. Croom Helm, London.

Crystal, D. (1997). *A Dictionary of Linguistics and Phonetics*. Blackwell, Oxford, fourth edition.

Czapiga, Z. (1994). *Predykatywność określeń w języku polskim i rosyjskim*. Wyższa Szkoła Pedagogiczna, Rzeszów.

Cząstka-Szymon, B., Synowiec, H., and Urban, K. (1996). *Mały Słownik Terminów Gramatycznych*. Towarzystwo Miłośników Języka Polskiego, Kraków and Warszawa.

Czuba, K. (1997). Towards minimal linguistic description: A hierarchical gender structure for Polish. In Junghanns and Zybatow (1997), pages 347–356.

Czuba, K. and Przepiórkowski, A. (1995). Agreement and case assignment in Polish: An attempt at a unified account. Technical Report 783, Institute of Computer Science, Polish Academy of Sciences.

Dąbrowska, A. (1998). *Słownik Eufemizmów Polskich*. Państwowe Wydawnictwo Naukowe, Warszawa.

Dąbrowska, E. (1994). Dative and nominative experiencers: two folk theories of the mind. *Linguistics*, **32**, 1029–1054.

Dalrymple, M., Shieber, S. M., and Pereira, F. C. N. (1991). Ellipsis and higher-order unification. *Linguistics and Philosophy*, **14**, 399–452.

Davis, A. (1997). *Lexical Semantics and Linking and the Hierarchical Lexicon*. Ph.D. thesis, Stanford University.

Derwojedowa, M. (1998). *Porządek Linearny Składników Zdania Elementarnego w Języku Polskim*. Ph.D. thesis, Uniwersytet Warszawski.

Dolbey, A. (1998). Constructional inheritance and case assignment in Finnish numeral expressions. *Nordic Journal of Linguistics*, **20**, 17–45.

Dornisch, E. (1995). Discourse-linking and multiple *Wh*-questions in Polish. In Gussmann (1995), pages 71–86.

Dornisch, E. (1998). *Multiple-Wh-Questions in Polish: The Interactions between Wh-Phrases and Clitics*. Ph.D. thesis, Cornell University.

Doroszewski, W., editor (1980). *Słownik Poprawnej Polszczyzny*. Państwowe Wydawnictwo Naukowe, Warszawa.

Doroszewski, W. and Kurkowska, H. (1973). *Słownik Poprawnej Polszczyzny*. Państwowe Wydawnictwo Naukowe, Warszawa.

Doroszewski, W. and Wieczorkiewicz, B., editors (1959). *Gramatyka Opisowa Języka Polskiego z Ćwiczeniami*, volume II: Fleksja, Składnia. Państwowe Zakłady Wydawnictw Szkolnych, Warszawa.

Dziwirek, K. (1990). Default agreement in Polish. In K. Dziwirek, P. Farrell, and E. Mejías-Bikandi, editors, *Grammatical Relations: A Cross-Theoretical Perspective*. CSLI Publications, Stanford.

Dziwirek, K. (1991). *Aspects of Polish Syntax*. Ph.D. thesis, University of California, San Diego.

Dziwirek, K. (1994). *Polish Subjects*. Garland, New York & London.

Dziwirek, K. (1998). Reduced construction in universal grammar: Evidence from the Polish object control construction. *Natural Language and Linguistic Theory*, **16**, 53–99.

Dziwirek, K., Coats, H., and Vakareliyska, C. M., editors (1999). *Annual Workshop on Formal Approaches to Slavic Linguistics: The Seattle Meeting 1998*, volume 44 of *Michigan Slavic Materials*, Ann Arbor. Michigan Slavic Publications.

Eisele, A. (1994). Towards probabilistic extensions of constraint-based grammars. In J. Dörre, editor, *Computational Aspects of Constraint-based Linguistic Description II*, volume R1.2.B of *DYANA-2*, pages 3–21, Centre for Cognitive Science, University of Edinburgh.

Fisiak, J., Lipińska-Grzegorek, M., and Zabrocki, T. (1978). *An Introductory English-Polish Contrastive Grammar*. Państwowe Wydawnictwo Naukowe, Warszawa.

Flickinger, D. (1987). *Lexical Rules in the Hierarchical Lexicon*. Ph.D. thesis, Stanford University, Stanford.

Fowler, G. (1987). *The Syntax of the Genitive Case in Russian*. Ph.D. thesis, University of Chicago, Chicago, Illinois.

Fowler, G. (1993). A syntactic account of derivational *-sja* in Russian. In R. Maguire and A. Timberlake, editors, *American Contributions to the Eleventh International Congress of Slavists*, pages 270–284. Slavica Publishers, Columbus, Ohio.

Fowler, G. and Yadroff, M. (1993). The argument status of accusative measure nominals in Russian. *Journal of Slavic Linguistics*, **1**(2), 251–79.

Frank, A. (1994). Verb second by underspecification. In H. Trost, editor, *KONVENS'94*, pages 121–130, Vienna.

Frank, A. and Reyle, U. (1995). Principle based semantics for HPSG. In *7th Conference of the European Chapter of the Association for Computational Linguistics*, pages 9–16, University College Dublin, Belfield, Dublin, Ireland. Association for Computational Linguistics.

Frank, A. and Reyle, U. (1996). Principle based semantics for HPSG. Arbeitspapiere des sonderforschungsbereichs 340, Institut für Maschinelle Sprachverarbeitung, Universität Stuttgart, Stuttgart. To appear.

Franks, S. (1983). Case and control in Polish. In W. Harbert, editor, *Cornell Working Papers in Linguistics*, volume 4, pages 23–49. Department of Modern Languages and Linguistics, Cornell University.

Franks, S. (1985). *Matrices and Indices: Some Problems in the Syntax of Case*. Ph.D. thesis, Cornell University.

Franks, S. (1986). Case and the structure of NP. In Brecht and Levine (1986b), pages 220–243.

Franks, S. (1990). Case, configuration and argumenthood: Reflections on second dative. *Russian Linguistics*, **14**, 231–254.

Franks, S. (1992). A prominence constraint on null operator constructions. *Lingua*, **88**, 1–20.

Franks, S. (1993). On parallelism in across-the-board dependencies. *Linguistic Inquiry*, **24**(3), 509–529.

Franks, S. (1994a). The functional structure of Russian Numeral Phrases. In Toman (1994), pages 31–76.

Franks, S. (1994b). Parametric properties of numeral phrases in Slavic. *Natural Language and Linguistic Theory*, **12**(4), 597–674.

Franks, S. (1995). *Parameters of Slavic Morphosyntax*. Oxford University Press, New York and Oxford.

Franks, S. (1998a). Clitics in Slavic. Position paper at the Workshop "Comparative Slavic Morphosyntax", Spencer, Indiana, 5–7 June, 1998.

Franks, S. (1998b). *Parameters of Slavic Morphosyntax* revisited: A minimalist perspective. In Bošković *et al.* (1998), pages 134–165.

Franks, S. and Bański, P. (1999). Approaches to "schizophrenic" Polish person agreement. In Dziwirek *et al.* (1999), pages 123–143.

Franks, S. and Dziwirek, K. (1993). Negated adjunct phrases are really partitive. *Journal of Slavic Linguistics*, **1**(2), 280–305.

Franks, S. and Greeneberg, G. (1988). Agreement, tense and the case of subjects in Russian. In *Papers from the 24th Regional Meeting of the Chicago Linguistic Society. The Parasession on Agreement*, pages 71–86. Chicago Linguistic Society.

Franks, S. and House, R. (1982). Genitive themes in Russian. In *Papers from the 18th Regional Meeting of the Chicago Linguistic Society*, pages 156–168. Chicago Linguistic Society, Chicago.

Franks, S. and King, T. H. (1999). *A Handbook of Slavic Clitics*. Oxford University Press. Forthcoming.

Freidin, R. and Babby, L. (1984). On the interaction of lexical and syntactic properties: Case structure in Russian. In Harbert (1984), pages 71–103.

Fried, M. (1999). The "free" datives in Czech as a linking problem. In Dziwirek *et al.* (1999), pages 145–166.

Gaertner, H., Passendorfer, A., and Kochański, W. (1961). *Poradnik Gramatyczny*. Państwowe Zakłady Wydawnictw Szkolnych, third edition.

Gazdar, G., Pullum, G. K., and Sag, I. A. (1982). Auxiliaries and related phenomena in a restrictive theory of grammar. *Language*, **58**(3), 591–638.

Gazdar, G., Klein, E., Pullum, G. K., and Sag, I. A. (1985). *Generalized Phrase Structure Grammar*. Blackwell and Harvard University Press, Cambridge and Cambridge, Mass.

Gerdemann, D. (1994). Complement inheritance as subcategorization inheritance. In Nerbonne *et al.* (1994), pages 341–363.

Giejgo, J. (1981). *Movement Rules in Polish Syntax*. Ph.D. thesis, U.C.L.

Ginzburg, J. and Sag, I. A. (1998). *English Interrogative Constructions*. CSLI Publications, Stanford. Draft of July, 1998.

Goddard, C. (1982). Case systems and case marking in Australian languages. *Australian Journal of Linguistics*, **2**, 167–96.

Gołąb, Z., Heinz, A., and Polański, K. (1968). *Słownik Terminologii Językoznawczej*. Państwowe Wydawnictwo Naukowe.

Grewendorf, G. (1994). Zur Satzwerigkeit von Infinitiven und Small Clauses. In A. Steube and G. Zybatow, editors, *Zur Satzwerigkeit von Infinitiven und Small Clauses*, volume 315 of *Linguistische Arbeiten*, pages 31–50. Niemeyer, Tübingen.

Grinder, J. and Postal, P. (1971). Missing antecedents. *Linguistic Inquiry*, **2**, 269–312.

Grochowski, M., editor (1995). *Wyrażenia Funkcyjne w Systemie i Tekście*. Wydawnictwo Uniwersytetu Mikołaja Kopernika, Toruń.

Groenendijk, J. and Stokhof, M. (1997). Questions. In J. van Benthem and A. ter Meulen, editors, *Handbook of Logic and Language*, pages 1055–1124. Elsevier and The MIT Press, Amsterdam and Cambridge, Mass.

Grosu, A. (1975). A note on subject raising to object and right node raising. *Linguistic Inquiry*, **6**(4), 642–645.

Grover, C. (1995). *Rethinking Some Empty Categories: Missing Objects and Parasitic Gaps in HPSG*. Ph.D. thesis, University of Essex.

Gruszczyński, W. (1986). O odmianie i składni tzw. liczebników złożonych. In H. Kurkowska, editor, *Współczesna Polszczyzna: Wybór Zagadnień*, pages 95–110. Państwowe Wydawnictwo Naukowe, Warszawa.

Gruszczyński, W. and Saloni, Z. (1978). Składnia grup liczebnikowych we współczesnym języku polskim. *Studia Gramatyczne*, **II**, 17–42.

Grzegorczykowa, R. (1998). *Wykłady z Polskiej Składni*. Państwowe Wydawnictwo Naukowe, Warszawa.

Grzegorczykowa, R. (1999). Problemy dyskusyjne w interpretacji tzw. orzeczenia imiennego. In Banyś *et al.* (1999), pages 118–124.

Grzegorczykowa, R., Laskowski, R., and Wróbel, H., editors (1984). *Gramatyka Współczesnego Języka Polskiego: Mofologia*. Państwowe Wydawnictwo Naukowe, Warszawa.

Gussmann, E., editor (1995). *Licensing in Syntax and Phonology*, volume 1 of *PASE Studies and Monographs*. Folium, Lublin.

Haegeman, L. (1994). *Introduction to Government and Binding Theory*. Blackwell Textbooks in Linguistics. Blackwell, Oxford, second edition.

Haider, H. (1985). The case in German. In J. Toman, editor, *Studies on German Grammar*, pages 65–101. Foris Publications, Dodrecht.

Haider, H. (1986). Fehlende Argumente: vom Passiv zu kohärenten Infinitiven. *Linguistische Berichte*, **101**, 3–33.

Haider, H. (1990). Topicalization and other puzzles of German syntax. In G. Grewendorf and W. Sternefeld, editors, *Scrambling and Barriers*, pages 93–112. Benjamins, Amsterdam.

Hamilton, R. (1996). Reflexivity, anaphoricity, or polymorphicity? Paper delivered during The First LINGUIST On-Line Conference: *Geometric And Thematic Structure In Binding*, `http://www.emich.edu/~linguist/linconf/`.

Hankamer, J. (1978). On the transformational derivation of some null VP anaphors. *Linguistic Inquiry*, **9**, 66–74.

Hankamer, J. and Sag, I. (1976). Deep and surface anaphora. *Linguistic Inquiry*, **7**(3), 391–426.

Harbert, W., editor (1984). *Cornell Working Papers in Linguistics*, volume 6. Department of Modern Languages and Linguistics, Cornell University.

Hardt, D. (1993). *Verb Phrase Ellipsis: Form, Meaning, and Processing*. Ph.D. thesis, University of Pennsylvania.

Harrer-Pisarkowa, K. (1959). Przypadek dopełnienia w polskim zdaniu zaprzeczonym. *Język Polski*, **XXXIX**(1), 8–32.

Heinz, W. and Matiasek, J. (1994). Argument structure and case assignment in German. In Nerbonne *et al.* (1994), pages 199–236.

Hinrichs, E. and Nakazawa, T. (1990). Subcategorization and VP structure in German. In S. Hughes and J. Salmons, editors, *Proceedings of the Third Symposium on Germanic Linguistics*, Amsterdam. Benjamins.

Hinrichs, E. and Nakazawa, T. (1994a). Linearizing AUXs in German verbal complexes. In Nerbonne *et al.* (1994), pages 11–37.

Hinrichs, E. and Nakazawa, T. (1994b). Partial VP and split NP topicalization in German: An HPSG analysis. In E. Hinrichs, D. Meurers, and T. Nakazawa, editors, *Partial-VP and Split-NP Topicalization in German—An HPSG Analysis and its Implementation*, volume 58 of *Arbeitspapiere des Sonderforschungsbereichs 340*, Tübingen. Seminar für Sprachwissenschaft, Universität Tübingen.

Hjemslev, L. (1935). *La catégorie des cas: Etude de grammaire générale*. Munksgaard, Copenhagen.

Höhle, T. N. (1983). Topologische Felder. Unpublished manuscript, Köln.

Höhle, T. N. (1999). An architecture for phonology. In Borsley and Przepiórkowski (1999), pages 61–90.

Holvoet, A. (1991). *Transitivity and Clause Structure in Polish. A Study in Case Marking*, volume 95 of *Prace Slawistyczne*. Slawistyczny Ośrodek Wydawniczy PAN, Warszawa.

Huang, C.-T. J. (1982). *Logical Relations in Chinese and the Theory of Grammar*. Ph.D. thesis, Massachusetts Institute of Technology.

Hudson, R. (1998). Functional control with and without structure-sharing. In A. Siewierska and J. J. Song, editors, *Case, Typology and Grammar*, volume 38 of *Typological Studies in Language*, pages 151–169. Benjamins, Amsterdam.

Hukari, T. E. and Levine, R. D. (1994). Adjunct extraction. In *Proceedings of the Twelfth Annual West Coast Conference on Formal Linguistics*, pages 283–298.

Hukari, T. E. and Levine, R. D. (1995). Adjunct extraction. *Journal of Linguistics*, **31**, 195–226.

Hukari, T. E. and Levine, R. D. (1996). On valence and antireconstruction. Unpublished manuscript. Version of 20 October, 1996.

Iida, M., Manning, C. D., O'Neill, P., and Sag, I. A. (1994). The lexical integrity of Japanese causatives. Paper presented at the 68th annual meeting of the Linguistic Society of America, Boston.

Jackendoff, R. (1972). *Semantic Interpretation in Generative Grammar.* The MIT Press, Cambridge, Mass.

Jackendoff, R. (1977). *X Syntax: A Study of Phrase Structure*, volume 2 of *Linguistic Inquiry Monographs.* The MIT Press, Cambridge, Mass.

Jackendoff, R. (1983). *Semantics and Cognition*, volume 8 of *Current Studies in Linguistics.* The MIT Press, Cambridge, Mass.

Jackendoff, R. (1990). *Semantic Structures*, volume 18 of *Current Studies in Linguistics.* The MIT Press, Cambridge, Mass.

Jackendoff, R. (1992). Madame Tussaud meets the Binding Theory. *Natural Language and Linguistic Theory*, **10**, 1–31.

Jackendoff, R. (1997). *The Architecture of Language Faculty*, volume 28 of *Linguistic Inquiry Monographs.* The MIT Press, Cambridge, Mass.

Jakobson, R. O. (1971a). Beitrag zur allgemeinen Kasuslehre. Gesamtbedeutungen der russischen Kasus. In *Selected Writings II*, pages 23–71. Mouton, The Hague.

Jakobson, R. O. (1971b). Morfologičeskie nabljudenija nad slavjanskim skloneniem. In *Selected Writings II*, pages 154–183. Mouton, The Hague.

Jaworska, E. (1986a). *Aspects of the Syntax of Prepositions and Prepositional Phrases in English and Polish.* Ph.D. thesis, University of Oxford.

Jaworska, E. (1986b). Prepositional phrases as subjects and objects. *Journal of Linguistics*, **22**, 355–374.

Jaworski, M. (1986). *Podręczna Gramatyka Języka Polskiego.* Wydawnictwa Szkolne i Pedagogiczne, Warszawa, fourth edition.

Jodłowski, S. (1976). *Podstawy Polskiej Składni.* Państwowe Wydawnictwo Naukowe, Warszawa.

Johnson, D. and Lappin, S. (1997). A critique of the Minimalist Program. *Linguistics and Philosophy*, **20**(3), 273–333.

Junghanns, U. and Zybatow, G., editors (1997). *Formale Slavistik*, volume 7 of *Leipziger Schriften zur Kultur-, Literatur-, Sprach- und Übersetzungswissenschaft*, Frankfurt am Main. Vervuert Verlag.

Kallas, K. (1974). O zdaniach *Pachniał wiatr i morze.*, *Andrzej i Amelia milczeli. Studia z filologii polskiej i slowiańskiej*, **XIV**, 67–71.

Kallas, K. (1986). Syntaktyczna charakterystyka wielofunkcyjnego *JAK*. *Polonica*, **XII**, 127–143.

Kallas, K. (1993). *Składnia Współczesnych Polskich Konstrukcji Współrzędnych*. Wydawnictwo Uniwersytetu Mikołaja Kopernika, Toruń.

Kallas, K. (1995). O konstrukcjach z przyimkiem *niż*. In Grochowski (1995), pages 99–110.

Kallas, K. (1996). Strukturalne uwarunkowania szyku w wybranych konstrukcjach z konektorem **niż**. In K. Kallas, editor, *Polonistyka Toruńska Uniwersytetowi w 50. Rocznicę Utworzenia UMK. Językoznawstwo*, pages 145–155. Wydawnictwo Uniwersytetu Mikołaja Kopernika, Toruń.

Kallas, K. (1998). Zaimki przeczące w polskim zdaniu. *Prace Filologiczne*, **XLIII**.

Kaplan, J. P. (1976). *Pro-Form Reference to Verb Phrases in English*. Ph.D. thesis, University of Pennsylvania.

Kaplan, R. M. and Bresnan, J. (1982). Lexical-Functional Grammar: A formal system for grammatical representation. In Bresnan (1982b), pages 173–281.

Kardela, H. (1986a). Target: Emphatics: A note on government, binding and case assignment in Polish. *Folia Linguistica*, **XX**(3–4), 381–392.

Kardela, H. (1986b). *Wh-movement in English and Polish: Theoretical Implications*, volume XLI of *Rozprawy Wydziału Humanistycznego: Rozprawy habilitacyjne*. Uniwersytet Marii Curie-Skłodowskiej, Wydział humanistyczny, Lublin.

Kasper, R. (1994). Adjuncts in the Mittelfeld. In Nerbonne *et al.* (1994), pages 39–69.

Kasper, R. (1997). Semantics of recursive modification. To appear in *Journal of Linguistics*.

Kathol, A. (1995). *Linearization-Based German Syntax*. Ph.D. thesis, Ohio State University.

Kathol, A. (1998). Agreement and the syntax-morphology interface in HPSG. In Levine and Green (1999). Forthcoming.

Kathol, A. (1999). *Linear Syntax*. Oxford University Press, Oxford. Forthcoming.

Kefer, M. (1979). A note on lexical entries. *Linguistic Inquiry*, **10**(2), 429–432.

Kehler, A. (1995). *Interpreting Cohesive Forms in the Context of Discourse Inference*. Ph.D. thesis, Harvard University. Available from the Center for Research in Computing Technology, Division of Applied Sciences, Harvard University, as technical report TR-11-95.

Kehler, A. and Ward, G. (1995). On the anaphoric status of *do so*. Paper delivered at the LSA Annual Meeting, New Orleans, LA, January 6, 1995.

Kim, J.-B. (1996). *The grammar of negation: a lexicalist, constraint-based perspective*. Ph.D. thesis, Stanford University.

Kim, J.-B. and Sag, I. A. (1996). French and English negation: A lexicalist alternative to head movement. Unpublished manuscript, Stanford University.

Kim, S. and Maling, J. (1993). Syntactic case and frequency adverbials in Korean. In *Harvard Studies in Korean Linguistics V*, pages 368–378.

Kim, S. and Maling, J. (1996). Case assignment in the *siphta* construction and its implications for case on adverbials. In R. King, editor, *Description and Explanation in Korean Linguistics*, pages 141–179. Cornell University Press.

King, P. J. (1989). *A Logical Formalism for Head-driven Phrase Structure Grammar*. Ph.D. thesis, University of Manchester.

King, P. J. (1994). An expanded logical formalism for Head-driven Phrase Structure Grammar. Arbeitspapiere des Sonderforschungsbereichs 340 Bericht Nr. 59, Seminar für Sprachwissenschaft, Universität Tübingen.

King, P. J. (1999). Towards truth in HPSG. In Kordoni (1999), pages 301–352.

King, T. H. (1995). *Configuring Topic and Focus in Russian*. CSLI Publications, Stanford.

Kiparsky, P. (1998). Partitive case and aspect. In M. Butt and W. Geuder, editors, *The Projection of Arguments*, number 83 in CSLI Lecture Notes, pages 265–307. CSLI Publications, Stanford.

Kiss, T. (1991). Variable Subkatorisierung: Eine Theorie unpersönlicher Einbettungen im Deutschen. Technical Report IWBS 161, IBM Germany, Stuttgart.

Kiss, T. (1994). Obligatory coherence: The structure of German modal verb constructions. In Nerbonne *et al.* (1994), pages 71–107.

Klein, E. (1993). An HPSG approach to Sierra Miwok verb stems. In T. M. Ellison and J. M. Scobbie, editors, *Computational Phonology*, volume 8 of *Edinburgh Working Papers in Cognitive Science*, pages 19–35. Centre for Cognitive Science, University of Edinburgh.

Klemensiewicz, Z. (1930). Liczebnik główny w polszczyźnie literackiej. Historia formy i składni. *Prace Filologiczne*, **25**.

Klemensiewicz, Z. (1968). *Podstawowe Wiadomości z Gramatyki Języka Polskiego*. Państwowe Wydawnictwo Naukowe, Warszawa, fifth edition.

Klemensiewicz, Z. (1985). *Historia Języka Polskiego*, volume III. Państwowe Wydawnictwo Naukowe, Warszawa.

Klemensiewicz, Z. (1986). *Podstawowe Wiadomości z Gramatyki Języka Polskiego*. Państwowe Wydawnictwo Naukowe, Warszawa, thirteenth edition.

Klemensiewicz, Z., Lehr-Spławiński, T., and Urbańczyk, S. (1955). *Gramatyka Historyczna Języka Polskiego*. Państwowe Wydawnictwo Naukowe.

Klenin, E. (1978). Quantification, partitivity, and the genitive of negation in Russian. In B. Comrie, editor, *Classification of grammatical categories*, pages 163–82. Linguistic Research, Inc., Edmonton.

Koenig, J.-P. (1999a). Inside-out constraints and description languages for HPSG. In Webelhuth *et al.* (1999), pages 265–279.

Koenig, J.-P. (1999b). *Lexical Relations*. CSLI Publications, Stanford.

Koneczna, H. (1949). Tysiące gwiazd świeciło.... *Poradnik Językowy*, **1**, 14–18.

Kopcińska, D. (1990). Założenia opisu strukturalnego zdań współczesnej polszczyzny pisanej ze składnikem realizującym akomodującą mianownikową frazę nominalną. *Studia Gramatyczne*, **IX**, 73–86.

Kopcińska, D. (1997). *Strukturalny Opis Składniowy Zdań z Podmiotem-Mianownikiem we Współczesnej Polszyźnie*. Dom Wydawniczy Elipsa, Warszawa.

Kordoni, V., editor (1999). *Tübingen Studies in Head-Driven Phrase Structure Grammar*, Arbeitspapiere des Sonderforschungsbereichs 340 Bericht Nr. 132, Seminar für Sprachwissenschaft, Universität Tübingen.

Koster, J. and Reuland, E., editors (1991). *Long-Distance Anaphora*. Cambridge University Press, Cambridge.

Krasnowolski, A. (1920). *Najpospolitsze błędy językowe zdarzające się w mowie i piśmie polskim*.

Krzyżanowski, P. (1995). O gramatycznej i pragmatycznej wartości wołacza. In Grochowski (1995), pages 181–185.

Kubiński, W. (1999). *Word Order in English and Polish: On the Statements of Linearization Patterns in Cognitive Grammar*. Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk.

Kubiszyn-Mędrala, Z. (1994). Problematyka konstrukcji bezmianownikowych w gramatyce generatywno-transformacyjnej (na wybranych przykładach). *Polonica*, **XVI**, 163–179.

Kuno, S. (1973). Constraints on internal clauses and sentential subjects. *Linguistic Inquiry*, **4**(3), 363–385.

Kuno, S. and Takami, K.-i. (1997). Remarks on Negative Islands. *Linguistic Inquiry*, **28**(4), 553–576.

Kupść, A. (1999a). Clitic climbing in Polish tense auxiliary constructions. In A. Todirascu, editor, *Proceedings of the ESSLLI Student Session*, pages 43–52, Utrecht.

Kupść, A. (1999b). Clitic climbing in Polish verb clusters: an HPSG approach. In G.-J. M. Kruijff and R. T. Oehrle, editors, *Proceedings of Formal Grammar 1999*, pages 75–82, Utrecht.

Kupść, A. (1999c). Haplology of the Polish reflexive marker. In Borsley and Przepiórkowski (1999), pages 91–124.

Kupść, A. (1999d). Negative concord and wh-extraction in Polish: A lexical HPSG approach. In Dziwirek *et al.* (1999), pages 289–306.

Kupść, A. (1999e). A syntactic analysis of clitic climbing in Polish. Paper delivered at The Sixth International Conference on HPSG, 4–6 August 1999, Edinburgh.

Kupść, A. and Marciniak, M. (1997). Some notes on HPSG binding theory for Polish. In Junghanns and Zybatow (1997), pages 193–204.

Kupść, A. and Przepiórkowski, A. (1999). Morphological aspects of verbal negation in Polish. In *Proceedings of the Second European Conference on Formal Description of Slavic Languages, Potsdam, Germany, November 20–22, 1997*. To appear.

Kuryłowicz, J. (1948). Zagadnienie klasyfikacji przypadków. *Sprawozdania PAU*, **XLIX**(9), 475–478.

Kuryłowicz, J. (1949). Le problème du classement des cas. *Biuletyn Polskiego Towarzystwa Językoznawczego*, **9**, 20–43.

Kuryłowicz, J. (1971). Słowiański genetivus po negacji. In *Sesja naukowa międzynarodowej komisji budowy języków słowiańskich, Polska Akademia Nauk — Oddział w Krakowie*, number 23 in Prace komisji słowianoznawstwa, pages 11–14, Wrocław. Zakład narodowy im. Ossolińskich.

Labocha, J. (1996). *Gramatyka Polska: Składnia*. Księgarnia Akademicka, Kraków.

Lakoff, G. and Ross, J. R. (1966). Criterion for Verb Phrase constituency. Mathematical Linguistics and Automatic Translation Report NSF-17, Computation Laboratory, Harvard University, Cambridge, Mass.

Lakoff, G. and Ross, J. R. (1976). Why you can't *do so* into the sink. In J. McCawley, editor, *Notes from the Linguistic Underground*, volume 7 of *Syntax and Semantics*, pages 101–111. Academic Press, New York. Originally appeared as Lakoff and Ross (1966).

Laskowski, R. (1984a). Liczebnik. In Grzegorczykowa *et al.* (1984), pages 283–293.

Laskowski, R. (1984b). Podstawowe pojęcia morfologii. In Grzegorczykowa *et al.* (1984), pages 9–57.

Lasnik, H. (1992). Case and expletives: Notes toward a parametric account. *Linguistic Inquiry*, **23**(3), 381–405.

Lasnik, H. (1995). Case and expletives revisited: On Greed and other human failings. *Linguistic Inquiry*, **26**, 615–635.

Lasnik, H. and Saito, M. (1984). On the nature of proper government. *Linguistic Inquiry*, **15**, 235–289.

Lasnik, H. and Saito, M. (1992). *Move α: Conditions on Its Application and Output*, volume 22 of *Current Studies in Linguistics*. The MIT Press, Cambridge, Mass.

Laurençot, E. (1997). On secondary predication and null case. In Lindseth and Franks (1997), pages 191–206.

Lebeaux, D. S. (1988). *Language Acquisition and the Form of the Grammar*. Ph.D. thesis, University of Massachsetts.

Lehr-Splawiński, T. and Kubiński, R. (1952). *Gramatyka Języka Polskiego*. Zakład narodowy im. Ossolińskich, sixth edition.

Leko, N. (1989). Case of noun phrases in Serbo-Croatian and case theory. *Folia Linguistica*, **XXXIII**(1–2), 27–54.

Levine, R. D. and Green, G., editors (1999). *Readings in HPSG*. Cambridge University Press, Cambridge. Forthcoming.

Levine, R. D., Hukari, T., and Calcagno, M. (1999). Parasitic gaps in English: non-nominal, non-pronominal, and case-consistent. Paper delivered at The Sixth International Conference on HPSG, 4–6 August 1999, Edinburgh.

Li, A. Y.-h. (1985). *Abstract Case in Chinese*. Ph.D. thesis, University of Southern California.

Li, A. Y.-h. (1990). *Order and Constituency*, volume 19 of *Studies in Natural Language and Linguistic Theory*. Kluwer, Dordrecht.

Lidz, J. (1996). On the independence of syntactic and thematic binding. Paper delivered during The First LINGUIST On-Line Conference: *Geometric And Thematic Structure In Binding*, `http://www.emich.edu/~linguist/linconf/`.

Lidz, J. (1997). Condition R. Unpublished manuscript. Version of August 18, 1997, `http://www.cis.upenn.edu/~jlidz/prog.html`.

Lindseth, M. and Franks, S., editors (1997). *Annual Workshop on Formal Approaches to Slavic Linguistics: The Indiana Meeting 1996*, volume 42 of *Michigan Slavic Materials*, Ann Arbor. Michigan Slavic Publications.

Łojasiewicz, A. (1980). O budowie wyrażeń z przyimkiem *po* dystrybutywnym. *Polonica*, **V**, 153–160.

Łoś, J. (1928). A commentary on Szober (1928). *Język Polski*, **XIII**(4), 107–112.

Lyons, J. (1976). *Wstęp do Językoznawstwa*. Państwowe Wydawnictwo Naukowe, Warszawa. Translated from English *Introduction to Theoretical Linguistics*, 1971, Cambridge University Press.

Macfarland, T. (1995). *Cognate Objects and the Argument : Adjunct Distinction in English*. Garland.

Małecki, A. (1863). *Gramatyka Języka Polskiego. Większa*. Lwów.

Maling, J. (1989). Adverbials and structural case in Korean. In S. Kuno, I.-H. Lee, J. Whitman, S.-Y. Bak, Y.-S. Kang, and Y.-j. Kim, editors, *Harvard Studies in Korean Linguistics III*, pages 297–308, Cambridge, Mass.

Maling, J. (1993). Of nominative and accusative: The hierarchical assignment of grammatical case in Finnish. In A. Holmberg and U. Nikanne, editors, *Case and Other Functional Categories in Finnish Syntax*, pages 51–76. Mouton, Dordrecht.

Maling, J. and Sprouse, R. (1995). Structural case, specifier-head relations and the case of predicate NPs. In H. Haider, S. Olsen, and S. Vikner, editors, *Studies in Comparative Germanic Syntax*, pages 167–186. Kluwer, Dordrecht.

Malouf, R. (1997). Mixed categories in HPSG. Version of February 5, 1997. To appear in Robert D. Borsley, ed., *Syntactic Categories*. New York: Academic Press.

Malouf, R. (1999a). A head-driven account of long-distance case assignment. Abstract for HPSG'99.

Malouf, R. (1999b). West Greenlandic noun incorporation in a monohierarchical theory of grammar. In Webelhuth *et al.* (1999), pages 47–62.

Mańczak, W. (1956). Ile jest rodzajów w polskim? *Język Polski*, **XXXVI**(2), 116–121.

Manning, C. D. and Sag, I. A. (1998). Argument structure, valence, and binding. *Nordic Journal of Linguistics*, **21**(2), 107–144.

Manning, C. D. and Sag, I. A. (1999). Dissociations between argument structure and grammatical relations. In Webelhuth *et al.* (1999), pages 63–78.

Manning, C. D., Sag, I. A., and Iida, M. (1997). The lexical integrity of Japanese causatives. Version of March 5, 1997.

Manning, C. D., Sag, I. A., and Iida, M. (1998). The lexical integrity of Japanese causatives. Version of June 10, 1998.

Manzini, M. R. (1983). On control and control theory. *Linguistic Inquiry*, **14**, 421–446.

Manzini, M. R. (1992). *Locality: A Theory and Some of Its Empirical Consequences*, volume 19 of *Linguistic Inquiry Monographs*. The MIT Press, Cambridge, Mass.

Marciniak, M. (1999). Toward a binding theory for Polish. In Borsley and Przepiórkowski (1999), pages 125–147.

Markowski, A., editor (1999). *Słownik Poprawnej Polszczyzny*. Państwowe Wydawnictwo Naukowe, Warszawa.

McConnell-Ginet, S. (1982). Adverbs and logical form: A linguistically realistic theory. *Language*, **58**(1), 144–184.

Meijs, W. (1984). 'You can do so if you want to': Some elliptic structures in Brown and LOB and their syntactic description. In J. Aarts and W. Meijs, editors, *Corpus Linguistics: Recent Developments in the Use of Computer Corpora in English Language Research*, pages 141–162. Rodopi, Amsterdam.

Mel'čuk, I. (1986). Toward a definition of case. In Brecht and Levine (1986b), pages 35–85.

Menantaud, H. (1989). O negacji jako kategorii fleksyjnej. *Język Polski*, **6**, 361–366.

Meurers, W. D. (1995). Towards a semantics for lexical rules as used in HPSG. In *Proceedings of ESSLLI7 Conference on Formal Grammar*, Barcelona, Spain. Universidad Politecnica de Catalunya. Also published in A. Copestake and D. Nicholls (eds.), *Proceedings of the ACQUILEX II Workshop on the Formalisation and Use of Lexical Rules*, 1995, Cambridge.

Meurers, W. D. (1999a). *Lexical Generalizations in the Syntax of German Non-Finite Constructions.* Ph.D. thesis, Universität Tübingen. In preparation. Partial draft of July 21, 1999.

Meurers, W. D. (1999b). Raising spirits (and assigning them case). To appear in T. Kiss and D. Meurers (eds.), *Topics in Constraint-Based Germanic Syntax*, CSLI Publications. Version of July 20, 1999.

Mieczkowska, H. (1994). *Kategoria Gramatyczna Liczebników w Ujęciu Konfrontatywnym Polsko-Słowackim*, volume 267 of *Rozprawy habilitacyjne.* Uniwersytet Jagielloński, Kraków.

Miller, P. H. (1990). Pseudogapping and *Do So* substitution. In M. Ziolkowski, M. Noske, and K. Deafon, editors, *Papers from the 26th Regional Meeting of the Chicago Linguistic Society*, pages 293–303, Chicago. Chicago Linguistic Society.

Miller, P. H. (1992). *Clitics and Constituents in Phrase Structure Grammar.* Garland, New York.

Miller, P. H. and Sag, I. A. (1997). French clitic movement without clitics or movement. *Natural Language and Linguistic Theory*, **15**, 573–639.

Mohanan, T. (1994). *Argument Structure in Hindi.* CSLI Publications, Stanford.

Monachesi, P. (1993). Restructuring verbs in Italian HPSG grammar. In K. Beals, G. Cooke, D. Kathman, S. Kita, K. McCullough, and D. Testen, editors, *Proceedings of the 29th Regional Meeting of the Chicago Linguistic Society*, pages 281–295, Chicago.

Monachesi, P. (1995). *A Grammar of Italian Clitics.* Ph.D. thesis, Tilburg University, Tilburg. ITK Dissertation Series 1995-3 and TILDIL Dissertation Series 1995-3.

Monachesi, P. (1998). Decomposing Italian clitics. In Balari and Dini (1998), pages 305–357.

Müller, S. (1997a). Complement extraction lexical rules and argument attraction. Research Report RR-97-08, DFKI, Saarbrücken. A shorter version appeared in *Natural Language Processing and Speech Technology. Results of the 3rd KONVENS Conference, Bielefeld, October 1996.*

Müller, S. (1997b). Yet another paper about Partial Verb Phrase fronting in German. Research Report RR-97-07, DFKI, Saarbrücken.

Müller, S. (1998a). Case in German — an HPSG analysis. Unpublished manuscript. Version of 30th August 1998 (with cartoon).

Müller, S. (1998b). Case in German — an HPSG analysis. Paper (to be) delivered at the Workshop on "Current topics in constraint-based theories of Germanic syntax," ESSLLI X. Version of 15th February 1998.

Mykowiecka, A. (1998). *Opis składniowy polskich konstrukcji względnych w formalizmie HPSG.* Ph.D. thesis, Institute of Computer Science, Polish Academy of Sciences, Warszawa.

Nagórko, A. (1996). *Zarys Gramatyki Polskiej.* Państwowe Wydawnictwo Naukowe, Warszawa.

Nash-Webber, B. L. and Sag, I. A. (1978). Under whose control? *Linguistic Inquiry*, **9**(1), 138–141.

Neidle, C. (1982). Case agreement in Russian. In Bresnan (1982b), pages 391–426.

Neidle, C. (1988). *The Role of Case in Russian Syntax*. Kluwer, Dordrecht.

Nerbonne, J., Netter, K., and Pollard, C., editors (1994). *German in Head-Driven Phrase Structure Grammar*. Number 46 in CSLI Lecture Notes. CSLI Publications, Stanford.

Nordlinger, R. (1998). *Constructive Case: Evidence from Australian Languages*. CSLI Publications, Stanford.

Passendorfer, A. (1905). *Słowniczek błędów językowych i najważniejszych prawideł gramatycznych*.

Penn, G. (1999). Linearization and *WH*-extraction in HPSG: Evidence from Serbo-Croatian. In Borsley and Przepiórkowski (1999), pages 149–182.

Pesetsky, D. (1982). *Paths and Categories*. Ph.D. thesis, Massachusetts Institute of Technology, Cambridge, Mass.

Pesetsky, D. (1987). *Wh*-in-situ: Movement and unselective binding. In E. J. Reuland and A. G. B. ter Meulen, editors, *The Representation of (In)definiteness*, pages 98–129. The MIT Press, Cambridge, Mass.

Piernikarski, C. (1986). Szeroko pojęte pronomina (PRO-KN). *Poradnik Językowy*, **4**, 229–236.

Pisarkowa, K. (1965). *Predykatywność Określeń w Polskim Zdaniu*. Zakład narodowy im. Ossolińskich, Wrocław.

Polański, K., editor (1993). *Encyklopedia Językoznawstwa Ogólnego*. Ossolineum, Wrocław.

Pollard, C. (1994). Toward a unified account of passive in German. In Nerbonne *et al.* (1994), pages 273–296.

Pollard, C. (1999). Strong generative capacity in HPSG. In Webelhuth *et al.* (1999), pages 281–297.

Pollard, C. and Sag, I. A. (1987). *Information-Based Syntax and Semantics, Volume 1: Fundamentals*. Number 13 in CSLI Lecture Notes. CSLI Publications, Stanford.

Pollard, C. and Sag, I. A. (1992). Anaphors in English and the scope of binding theory. *Linguistic Inquiry*, **23**(2), 261–303.

Pollard, C. and Sag, I. A. (1994). *Head-driven Phrase Structure Grammar*. Chicago University Press, Chicago.

Pollard, C. and Yoo, E. J. (1998). A unified theory of scope for quantifiers and *wh*-phrases. *Journal of Linguistics*, **34**, 415–445.

Pollock, J.-Y. (1989). Verb movement, universal grammar and the structure of IP. *Linguistic Inquiry*, **20**, 365–424.

Progovac, L. (1988). *A Binding Approach to Polarity Sensitivity*. Ph.D. thesis, University of Southern California, Los Angeles.

Progovac, L. (1991). Polarity in Serbo-Croatian: Anaphoric NPIs and pronominal PPIs. *Linguistic Inquiry*, **22**(3), 567–572.

Progovac, L. (1993). Negative polarity: Entailment and binding. *Linguistics and Philosophy*, **16**, 149–180.

Progovac, L. (1994). *Negative and Positive Polarity*. Cambridge University Press, Cambridge.

Progovac, L. (1998). 'Avoid conjunction,' adjunction, and the 'coordination of likes constraint'. In Bošković *et al.* (1998), pages 252–266.

Przepiórkowski, A. (1994). Critical review of approaches to multiple wh-movement. Research Paper EUCCS/RP-62, Centre for Cognitive Science, University of Edinburgh.

Przepiórkowski, A. (1995). Transmisja wymagań składniowych. Technical Report 766, Institute of Computer Science, Polish Academy of Sciences. Preprint of Przepiórkowski (1997d).

Przepiórkowski, A. (1996a). Case assignment in Polish: Towards an HPSG analysis. In C. Grover and E. Vallduví, editors, *Studies in HPSG*, volume 12 of *Edinburgh Working Papers in Cognitive Science*, pages 191–228. Centre for Cognitive Science, University of Edinburgh.

Przepiórkowski, A. (1996b). Non-configurational case assignment in HPSG. Paper delivered at the 3rd International Conference on HPSG, 20–22 May 1996, Marseille, France.

Przepiórkowski, A. (1997a). Adjuncts as complements: Evidence from case assignment. Paper delivered at the 4th International Conference on HPSG, 18–20 July 1997, Ithaca, New York.

Przepiórkowski, A. (1997b). Case assignment in Polish: Towards an HPSG analysis. In Junghanns and Zybatow (1997), pages 307–319.

Przepiórkowski, A. (1997c). Quantifiers, adjuncts as complements, and scope ambiguities. To appear in *Journal of Linguistics*. Draft of December 2, 1997.

Przepiórkowski, A. (1997d). Transmisja wymagań składniowych. *Polonica*, **XVIII**, 29–50.

Przepiórkowski, A. (1998a). 'A Unified Theory of Scope' revisited: Quantifier retrieval without spurious ambiguities. In Bouma *et al.* (1998b), pages 185–195.

Przepiórkowski, A. (1998b). *Do So* and lexical theories of passivization. Paper delivered at Spring 1998 Meeting of the Linguistics Association of Great Britain, Lancaster, Great Britain, April 14–16 1998.

Przepiórkowski, A. (1999a). Negative polarity questions and Italian negative concord. In Kordoni (1999), pages 353–400.

Przepiórkowski, A. (1999b). On case assignment and "adjuncts as complements". In Webelhuth *et al.* (1999), pages 231–245.

Przepiórkowski, A. (1999c). On complements and adjuncts in Polish. In Borsley and Przepiórkowski (1999), pages 183–210.

Przepiórkowski, A. (1999d). On negative eventualities, negative concord, and negative *yes/no* questions. In T. Matthews and D. Strolovitch, editors, *Proceeding of Semantics and Linguistic Theory 9*, pages 237–254, Ithaca, NY. CLC Publications.

Przepiórkowski, A. (1999e). Verbal proforms and the structural complement-adjunct distinction in Polish. In *Proceedings of the Second European Conference on Formal Description of Slavic Languages, Potsdam, Germany, November 20–22, 1997.* To appear.

Przepiórkowski, A. and Kupść, A. (1997a). Negative concord in Polish. Technical Report 828, Institute of Computer Science, Polish Academy of Sciences.

Przepiórkowski, A. and Kupść, A. (1997b). Unbounded negative concord in Polish: A lexicalist HPSG approach. In J. Landsbergen, J. Odijk, K. van Deemter, and G. V. van Zanten, editors, *Computational Linguistics in the Netherlands 1996: Papers from the Seventh CLIN Meeting*, pages 129–143, Eindhoven. IPO, Center for Research on User-System Interaction, Technische Universiteit Eindhoven.

Przepiórkowski, A. and Kupść, A. (1997c). Verbal negation and complex predicate formation in Polish. In R. C. Blight and M. J. Moosally, editors, *Proceedings of the 1997 Texas Linguistics Society Conference on the Syntax and Semantics of Predication*, volume 38 of *Texas Linguistic Forum*, pages 247–261, Austin, Texas.

Przepiórkowski, A. and Kupść, A. (1999). Eventuality negation and negative concord in Polish and Italian. In Borsley and Przepiórkowski (1999), pages 211–246.

Przepiórkowski, A. and Świdziński, M. (1997). Polish verbal negation revisited: A metamorphosis vs. HPSG account. Technical Report 829, Institute of Computer Science, Polish Academy of Sciences.

Pullum, G. K. (1996). Nostalgic views from Building 20. *Journal of Linguistics*, **32**, 137–147.

Puzynina, J. (1969). *Nazwy Czynności we Współczesnym Języku Polskim.* Państwowe Wydawnictwo Naukowe, Warszawa.

Radford, A. (1988). *Transformational Grammar: A First Course.* Cambridge University Press, Cambridge.

Radford, A. (1997). *Syntactic Theory and the structure of English: A Minimalist Approach.* Cambridge University Press, Cambridge.

Rappaport, G. C. (1986a). The grammar of simile: Case and configuration. In Brecht and Levine (1986b), pages 244–279.

Rappaport, G. C. (1986b). On anaphor binding in Russian. *Natural Language and Linguistic Theory*, **4**, 97–120.

Rappaport, G. C. (1997). Clitics as features: A non-semiotic approach. To appear in: American Contributions to the International Congress of Slavists. Version of 7th March 1997.

Reape, M. (1992). *A Formal Theory of Word Order: A Case Study in West Germanic.* Ph.D. thesis, University of Edinburgh.

Reape, M. (1994). Domain union and word order variation in German. In Nerbonne *et al.* (1994), pages 151–197.

Reinders-Machowska, E. (1991). Binding in Polish. In Koster and Reuland (1991), pages 137–150.

Reinhart, T. and Reuland, E. (1991). Anaphors and logophors: An argument structure perspective. In Koster and Reuland (1991), pages 283–334.

Reinhart, T. and Reuland, E. (1993). Reflexivity. *Linguistic Inquiry*, **24**, 657–720.

Reuland, E. and Koster, J. (1991). Long-distance anaphora: An overview. In Koster and Reuland (1991), pages 1–25.

Reuland, E. and Reinhart, T. (1995). Pronouns, anaphors and case. In H. Haider, S. Olsen, and S. Vikner, editors, *Studies in Comparative Germanic Syntax*, pages 241–268. Kluwer, Dordrecht.

Richter, F. (1997). Die Satzstruktur des Deutschen und die Behandlung langer Abhängigkeiten in einer Linearisierungsgrammatik. Formale Grundlagen und Implementierung in einem HPSG-Fragment. In E. Hinrichs, D. Meurers, F. Richter, M. Sailer, and H. Winhart, editors, *Ein HPSG-Fragment des Deutschen, Teil 1: Theorie*, Arbeitspapiere des Sonderforschungsbereichs 340 Bericht Nr. 95, Seminar für Sprachwissenschaft, Universität Tübingen, pages 13–187.

Richter, F. (1999a). *A Mathematical Formalism for Linguistic Theories with an Application in Head-Driven Phrase Structure Grammar.* Ph.D. thesis, Universität Tübingen. Draft of September 2, 1999.

Richter, F. (1999b). RSRL for HPSG. In Kordoni (1999), pages 74–115.

Richter, F. and Sailer, M. (1997). Underspecified semantics in HPSG. In H. Bunt, L. Kievit, R. Muskens, and M. Verlinden, editors, *Proceedings of the* Second International Workshop on Computational Semantics, 8–10 January 1997, Tilburg, pages 234–246.

Richter, F. and Sailer, M. (1999a). LF conditions on expressions of Ty2: An HPSG analysis of Negative Concord in Polish. In Borsley and Przepiórkowski (1999), pages 247–282.

Richter, F. and Sailer, M. (1999b). Underspecified semantics in HPSG. In H. C. Bunt and R. Muskens, editors, *Computing Meaning*, pages 95–112. Kluwer, Dordrecht. Forthcoming.

Richter, F., Sailer, M., and Penn, G. (1999). A formal interpretation of relations and quantification in HPSG. In Bouma *et al.* (1999a), pages 279–296. Forthcoming.

Riehemann, S. (1993). *Word Formation in Lexical Type Hierarchies: A Case Study of* bar-*Adjectives in German.* Master's thesis, Universität Tübingen.

Riehemann, S. (1994). Morphology and the hierarchical lexicon. Unpublished manuscript. Draft of June 24, 1994.

Riehemann, S. (1995). Type-based morphology. Unpublished manuscript, Stanford University.

Rizzi, L. (1990). *Relativized Minimality*. The MIT Press, Cambridge, Mass.

Rizzi, L. (1994). Argument/adjunct (a)symmetries. In G. Cinque, J. Koster, J.-Y. Pollock, L. Rizzi, and R. Zanuttini, editors, *Paths Towards Universal Grammar: Studies in Honor of Richard S. Kayne*, pages 361–376. Georgetown University Press, Washington, D.C.

Roberts, I. (1997). *Comparative Syntax*. Arnold, London.

Ross, J. (1967). *Constraints on Variables in Syntax*. Ph.D. thesis, Massachusetts Institute of Technology.

Rothstein, R. A. (1986). Equation vs. ascription: The nominative/instrumental opposition in West Slavic. In Brecht and Levine (1986b), pages 312–322.

Rouveret, A. and Vergnaud, J.-R. (1980). Specifying reference to the subject: French causatives and conditions on representations. *Linguistic Inquiry*, **11**(1), 97–202.

Rozwadowska, B. T. (1995). Configurational hypothesis and Polish NPs. *Papers and Studies in Contrastive Linguistics*, **XXX**, 131–144.

Rozwadowska, B. T. (1997). *Towards a Unified Theory of Nominalizations. External and Internal Eventualities*. Wydawnictwo Uniwersytetu Wrocławskiego, Wrocław.

Rubach, J. and Booij, G. E. (1985). A grid theory of stress in Polish. *Lingua*, **66**, 281–319.

Rudin, C. (1988). On multiple questions and multiple wh-fronting. *Natural Language and Linguistic Theory*, **6**, 445–501.

Rudin, C. (1989). Multiple questions South, West, and East: A government-binding approach to the typology of wh movement in Slavic languages. Unpublished manuscript. To appear in IJSLP.

Rutkowski, P. (1999). Składnia polskich grup liczebnikowych: próba opisu formalnego. Unpublished manuscript, University of Warsaw.

Rybicka-Nowacka, H. (1990). Przypadek dopełnienia w konstrukcjach zaprzeczonych we współczesnym języku polskim (norma a praktyka językowa). *Poradnik Językowy*, **8**, 572–577.

Ryu, B.-R. (1993). Structure sharing and argument transfer: An HPSG approach to verbal noun constructions. SfS Report 04-93, Seminar für Sprachwissenschaft, Universität Tübingen.

Sadziński, R. (1989). *Statische und dynamische Valenz: Probleme einer kontrastiven Valenzgrammatik Deutsch-Polnisch*, volume 1 of *Beiträge zur Sprachwissenschaft*. Helmut Buske Verlag, Hamburg.

Sag, I. A. (1976). *Deletion and Logical Form*. Ph.D. thesis, Massachusetts Institute of Technology, Cambridge, Mass.

Sag, I. A. (1979). The nonunity of anaphora. *Linguistic Inquiry*, **10**, 152–164.

Sag, I. A. (1997). English relative clause constructions. *Journal of Linguistics*, **33**(2), 431–483.

Sag, I. A. and Fodor, J. D. (1994). Extraction without traces. In R. Aranovich, W. Byrne, S. Preuss, and M. Senturia, editors, *Proceedings of the Thirteenth West Coast Conference on Formal Linguistics*, Stanford University. CSLI Publications/SLA.

Sag, I. A. and Hankamer, J. (1977). Syntactically vs. pragmatically controlled anaphora. In R. W. F. R. W. Shuy, editor, *Studies in Language Variation: Semantics, Syntax, Phonology, Pragmatics, Social Situations, Ethnographic Approaches*, pages 120–135, Washington. Georgetown UP. Papers from the Third Annual Colloquium on New Ways of Analyzing Variation, Georgetown University, 1974.

Sag, I. A. and Hankamer, J. (1984). Toward a theory of anaphoric processing. *Linguistics and Philosophy*, **7**, 325–345.

Sag, I. A. and Wasow, T. (1999). *Syntactic Theory: A Formal Introduction*. CSLI Publications, Stanford.

Sag, I. A., Karttunen, L., and Goldberg, J. (1992). A lexical analysis of Icelandic case. In I. A. Sag and A. Szabolcsi, editors, *Lexical Matters*, number 24 in CSLI Lecture Notes, pages 301–318. CSLI Publications, Stanford.

Saloni, Z. (1976). *Cechy Składniowe Polskiego Czasownika*. Ossolineum, Wrocław.

Saloni, Z. (1977). Kategorie gramatyczne liczebników we współczesnym języku polskim. *Studia Gramatyczne*, **I**, 145–173.

Saloni, Z. and Świdziński, M. (1985). *Składnia Współczesnego Języka Polskiego*. Państwowe Wydawnictwo Naukowe, second edition.

Saloni, Z. and Świdziński, M. (1998). *Składnia Współczesnego Języka Polskiego*. Państwowe Wydawnictwo Naukowe, fourth (changed) edition.

Sanfilippo, A. (1998). Thematically bound adjuncts. In Balari and Dini (1998), pages 359–395.

Sawicki, L. (1988). *Verb-Valency in Contemporary Polish*. Number 319 in Tübinger Beiträge zur Linguistik. Gunter Narr Verlag, Tübingen.

Schabowska, M. (1962). O formalnej numeralizacji liczebników. *Język Polski*, **XLII**(2), 116–123.

Schabowska, M. (1967). *Rzeczowniki Ilościowe w Języku Polskim*. Ossolineum, Wrocław.

Schabowska, M. (1970). Liczebnik nieokreślony *trochę*. *Język Polski*, **L**(2), 110–118.

Schachter, P. (1977). Does she or doesn't she? *Linguistic Inquiry*, **8**, 763–767.

Schenker, A. M. (1964). *Polish Declension*. Mouton, The Hague.

Schenker, A. M. (1971). Some remarks on Polish quantifiers. *Slavic and East European Journal*, **XV**(1), 54–59.

Schoorlemmer, M. (1994). Dative subjects in Russian. In Toman (1994), pages 129–172.

Silva, C. M. (1975). Adverbial *-ing*. *Linguistic Inquiry*, **6**(2), 346–350.

Simpson, J. (1991). *Warlpiri Morpho-Syntax*, volume 23 of *Studies in Natural Language and Linguistic Theory*. Kluwer, Dordrecht.

Skinner, B. F. (1957). *Verbal Behavior*. Appleton-Century-Crofts, New York.

Smith, H. (1996). *Restrictiveness in Case Theory*. Cambridge University Press, Cambridge.

Smith, J. D. (1999). English number names in HPSG. In Webelhuth *et al.* (1999), pages 145–160.

Sobin, N. J. (1985). Case assignment in Ukrainian morphological passive constructions. *Linguistic Inquiry*, **16**(4), 649–662.

Somers, H. L. (1984). On the validity of the complement-adjunct distinction in valency grammar. *Linguistics*, **22**, 507–530.

Spencer, A. (1991). *Morphological Theory*. Blackwell, Oxford.

Stainton, R. J. (1998). Quantifier phrases, meaningfulness "in isolation", and ellipsis. *Linguistics and Philosophy*, **21**, 311–340.

Sternefeld, W. (1998). Review article: Andrew Radford, Syntactic theory and the structure of English. Submitted to *English Language and Linguistics*.

Stjepanović, S. (1997). Is inherent case structural? In Lindseth and Franks (1997), pages 295–311.

Stowell, T. (1981). *Origins of Phrase Structure*. Ph.D. thesis, Massachusetts Institute of Technology.

Strutyński, J. (1997). *Gramatyka Polska*. Wydawnictwo Tomasz Strutyński, Kraków.

Świdziński, M. (1992a). *Gramatyka Formalna Języka Polskiego*, volume 349 of *Rozprawy Uniwersytetu Warszawskiego*. Wydawnictwa Uniwersytetu Warszawskiego, Warszawa.

Świdziński, M. (1992b). Realizacje zdaniowe podmiotu-mianownika, czyli o strukturalnych ograniczeniach selekcyjnych. In A. Markowski, editor, *Opisać Słowa*, pages 188–201. Dom Wydawniczy Elipsa.

Świdziński, M. (1993). Dalsze kłopoty z bezokolicznikiem. In J. Sambor, J. Linde-Usiekniewicz, and R. Huszcza, editors, *Językoznawstwo synchroniczne i diachroniczne*, pages 303–314. Wydawnictwa Uniwersytetu Warszawskiego, Warszawa.

Świdziński, M. (1994). Syntactic dictionary of Polish verbs. Unpublished manuscript.

Świdziński, M. (1996). *Własności Składniowe Wypowiedników Polskich*. Dom Wydawniczy Elipsa, Warszawa.

Świdziński, M. (1997). *Elemeny Gramatyki Opisowej Języka Polskiego*. Uniwersytet Warszawski, Wydział Polonistyki, Warszawa.

Świdziński, M. (1998). Negacja w polszczyźnie: uwikłania składniowe imiesłowów, gerundiów i quasi-gerundiów. *Prace Filologiczne*, **XLIII**, 411–420.

Świdziński, M. (1999a). Negativity transmission in Polish constructions with participles and gerunds. Unpublished manuscript.

Świdziński, M. (1999b). O ograniczeniach aparatu pojęciowego schematów zdaniowych. In Banyś *et al.* (1999), pages 187–197.

Szober, S. (1928). *Trzy piękne córki było nas u matki*: Formy podmiotu i orzeczenia w zdaniach z podmiotem logicznym, określonym przydawką liczebnikową. *Język Polski*, **XIII**(4), 97–106.

Szober, S. (1937). *Słownik ortoepiczny*. Second edition.

Szober, S. (1953). *Gramatyka Języka Polskiego*. Nasza Księgarnia, Warszawa, third edition.

Szpakowicz, S. and Świdziński, M. (1981). Formalna definicja równorzędnej grupy nominalnej we współczesnej polszczyźnie pisanej. Unpublished manuscript.

Szpakowicz, S. and Świdziński, M. (1990). Formalna definicja równorzędnej grupy nominalnej we współczesnej polszczyźnie pisanej. *Studia Gramatyczne*, **IX**, 9–54.

Szupryczyńska, M. (1978). Cechy składniowe formy mianownikowej przymiotnika w polskich zdaniach łącznikowych. *Studia Gramatyczne*, **II**, 63–103.

Szupryczyńska, M. (1979). Związki składniowe form stopnia wyższego polskiego przymiotnika. *Polonica*, **V**, 115–137.

Tajsner, P. (1990). *Case Marking in English and Polish: A Government and Binding Study*. Ph.D. thesis, Uniwersytet im. Adama Mickiewicza, Poznań.

Tenny, C. L. (1996). Short distance pronouns and locational deixis. Paper delivered during The First LINGUIST On-Line Conference: *Geometric And Thematic Structure In Binding*, `http://www.emich.edu/~linguist/linconf/`.

Tesnière, L. (1959). *Éléments de Syntaxe Structurale*. Klincksieck, Paris.

Timberlake, A. (1975). Hierarchies in the genitive of negation. *Slavic and East European Journal*, **19**, 123–38.

Timberlake, A. (1986). Hierarchies in the genitive of negation. In Brecht and Levine (1986b), pages 338–360.

Toman, J., editor (1994). *Annual Workshop on Formal Approaches to Slavic Linguistics: The Ann Arbor Meeting 1992*, volume 35 of *Michigan Slavic Materials*, Ann Arbor. Michigan Slavic Publications.

Trask, R. L. (1993). *A Dictionary of Grammatical Terms in Linguistics*. Routledge, London.

Uszkoreit, H. (1987). *Word Order and Constituent Structure in German*. Number 9 in CSLI Lecture Notes. CSLI Publications, Stanford.

van Noord, G. and Bouma, G. (1994). Adjuncts and the processing of lexical rules. In *Fifteenth International Conference on Computational Linguistics (COLING '94)*, pages 250–256, Kyoto, Japan.

van Oirsouw, R. R. (1981). Gazdar on coordination and constituents. *Linguistic Inquiry*, **12**(3), 553–557.

Vater, H. (1978a). On the possibility of distinguishing between complements and adjuncts. In W. Abraham, editor, *Valence, Semantic Case and Grammatical Relations*, volume 1 of *Studies in Language Companion Series (SLCS)*, pages 21–45. Benjamins, Amsterdam.

Vater, H. (1978b). Probleme der Verbvalenz. Technical Report KLAGE Nr.1, Universität Köln.

Vergnaud, J.-R. (1982). *Dépendances et Niveaux de Representation en Syntaxe*. Ph.D. thesis, Université de Paris VII.

Verspoor, C. M. (1997). *Contextually-Dependent Lexical Semantics*. Ph.D. thesis, University of Edinburgh, Edinburgh, Scotland.

Wachowicz, K. (1974). Against the universality of a single wh-question movement. *Foundations of Language*, **11**, 155–166.

Walasiuk, E. (1998). Leksem *i* i pokrewne wykładniki organizacji tekstu. *Acta Universitatis Nicolai Copernici: Filologia Polska*, **L**(324), 159–170.

Webber, B. L. (1978). *A Formal Approach to Discourse Anaphora*. Ph.D. thesis, Harvard University.

Webber, B. L. (1979). *A Formal Approach to Discourse Anaphora*. Garland, New York. Published version of Webber (1978).

Webelhuth, G., editor (1995a). *Government and Binding Theory and the Minimalist Program*. Number 1 in Generative Syntax. Blackwell, Oxford.

Webelhuth, G. (1995b). X-bar theory and case theory. In Webelhuth (1995a), pages 15–95.

Webelhuth, G., Koenig, J.-P., and Kathol, A., editors (1999). *Lexical and Constructional Aspects of Linguistic Explanation*. CSLI Publications, Stanford.

Wechsler, S. (1995). *The Semantic Basis of Argument Structure*. CSLI Publications, Stanford.

Wechsler, S. (1997). Prepositional phrases from the twilight zone. *Nordic Journal of Linguistics*, **20**, 127–154.

Wechsler, S. (1999). Four agreement puzzles. Paper delivered at The Sixth International Conference on HPSG, 4–6 August 1999, Edinburgh.

Wechsler, S. and Lee, Y.-S. (1996). The domain of direct case assignment. *Natural Language and Linguistic Theory*, **14**, 629–664.

Wechsler, S. and Zlatić, L. (1999). Syntax and morphological realization in Serbo-Croatian. In Borsley and Przepiórkowski (1999), pages 283–309.

Węgrzynek, K. (1994). O możliwości redukcji tzw. słów łącznikowych. *Polonica*, **XVI**, 127–144.

Wierzbicka, A. (1966). Czy istnieją zdania bezpodmiotowe. *Język Polski*, **XLVI**(3), 177–196.

Wierzbicka, A. (1980). *The Case for Surface Case*. Karoma, Ann Arbor.

Wierzbicka, A. (1981). Case marking and human nature. *Australian Journal of Linguistics*, **1**, 43–80.

Wierzbicka, A. (1983). The semantics of case marking. *Studies in Language*, **7**, 247–275.

Wierzbicka, A. (1986). The meaning of a case: A study of the Polish dative. In Brecht and Levine (1986b), pages 386–426.

Williams, E. (1977a). Discourse and logical form. *Linguistic Inquiry*, **8**(1), 101–139.

Williams, E. (1977b). On deep and surface anaphora. *Linguistic Inquiry*, **8**(4), 692–696.

Williams, E. (1980). Predication. *Linguistic Inquiry*, **11**(1), 203–238.

Williams, E. (1995). Theta theory. In Webelhuth (1995a), pages 97–124.

Willim, E. (1989). *On Word Order: A Government-Binding Study of English and Polish*, volume 100 of *Zeszyty Naukowe Uniwersytetu Jagiellonskiego*. Uniwersytet Jagielloński, Kraków.

Willim, E. (1990). On case-marking in Polish. *Papers and Studies in Contrastive Linguistics*, **XXV**, 203–220.

Willim, E. (1995). In defence of the subject: Evidence from Polish. In Gussmann (1995), pages 147–164.

Witkoś, J. (1992). Subject/object asymmetry in extraction from clausal complements in Polish. Paper presented at the XXVI International Conference on Polish-English Contrastive Linguistics, Rydzyna.

Witkoś, J. (1993). *Some Aspects of Phrasal Movement in English and Polish*. Ph.D. thesis, Uniwersytet im. Adama Mickiewicza, Poznań.

Witkoś, J. (1995). Wh-extraction from clausal complements in Polish: A minimality/locality account. *Folia Linguistica*, **XXIX**(3/4), 223–264.

Witkoś, J. (1996a). On NegP and the structure of the Polish clause. *Papers and Studies in Contrastive Linguistics*, **XXXI**, 65–96.

Witkoś, J. (1996b). Pronominal argument placement in Polish. *Wiener Linguistische Gazette*, **57–59**, 147–194.

Witkoś, J. (1998). *The Syntax of Clitics: Steps towards a Minimalist Account*. motivex, Poznań.

Witkoś, J. (1999). Nominative-to-genitive shift and the negative copula *nie ma/not is*: Implications for the checking theory. Unpublished manuscript.

Wróbel, H. (1998). Granice paradygmatu fleksyjnego czasowników. In O. Wolińska, editor, *Prace Językoznawcze 25: Studia historycznojęzykowe*, pages 255–264. Wydawnictwo Uniwersytetu Śląskiego, Katowice.

Xue, P., Pollard, C., and Sag, I. A. (1994). A new perspective on Chinese *ZIJI*. In R. Aranovich, W. Byrne, S. Preuss, and M. Senturia, editors, *Proceedings of the Thirteenth West Coast Conference on Formal Linguistics*, volume 13. CSLI Publications/SLA.

Yip, M., Maling, J., and Jackendoff, R. (1987). Case in tiers. *Language*, **63**(2), 217–250.

Yoo, E.-J. (1993). Subcategorization and case marking in Korean. In A. Kathol and C. Pollard, editors, *Papers in Syntax*, volume 42 of *OSU Working Papers in Linguistics*, pages 178–198. The Ohio State University, Columbus, Ohio.

Zabrocki, T. (1981). *Lexical Rules of Semantic Interpretation: Control and NP Movement in English and Polish*. Number 14 in Filologia Angielska. Uniwersytet im. Adama Mickiewicza, Poznań.

Zabrocki, T. (1989). A surface structure constraint and its consequence for a positional and an inflectional language. In J. Fisiak, editor, *Further Insights into Contrastive Analysis*, pages 85–109. Benjamins, Amsterdam.

Zaenen, A. and Maling, J. (1983). Passive and oblique case. In L. S. Levin, M. Rappaport, and A. Zaenen, editors, *Papers in Lexical-Functional Grammar*, pages 159–191. Indiana University Linguistics Club, Bloomington.

Zaenen, A., Maling, J., and Thráinsson, H. (1985). Case and grammatical functions: The Icelandic passive. *Natural Language and Linguistic Theory*, **3**(4), 441–483.

Zagona, K. (1988). *Verb Phrase Syntax: A Parametric Study of English and Spanish*, volume 13 of *Studies in Natural Language and Linguistic Theory*. Kluwer, Dordrecht.

Zlatić, L. (1996). Syntactico-semantic approach to binding: Evidence from Serbian. Paper delivered during The First LINGUIST On-Line Conference: *Geometric And Thematic Structure In Binding*, `http://www.emich.edu/~linguist/linconf/`.

Zlatić, L. (1997a). Process nominals and anaphor binding in Serbian. In Browne *et al.* (1997), pages 464–487.

Zlatić, L. (1997b). *The Structure of the Serbian Noun Phrase*. Ph.D. thesis, University of Texas, Austin.

Zribi-Hertz, A. (1989). A-type binding and narrative point of view. *Language*, **65**, 695–727.

Zwicky, A. M. (1970). Auxiliary reduction in English. *Linguistic Inquiry*, **1**, 323–336.

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EDUCATION

Feb 1996–Jan 1999 **Tübingen Universität**, Seminar für Sprachwissenschaft

Ph.D. student in Computational Linguistics at SfS, Tübingen. Thesis title: "Case Assignment and the Complement/Adjunct Dichotomy: A Non-Configurational Constraint-Based Approach". Supervisor: Prof. Erhard W. Hinrichs.

Oct 1987–Mar 1995 **Unversity of Warsaw**, Computer Science

MSc student in Computer Science at the University of Warsaw, Faculty of Mathematics, Informatics and Mechanics. Graduation with honours in April, 1995.

Oct 1993–May 1994 **Edinburgh University**, Centre for Cognitive Science

Non-graduating MSc student at the Centre for Cognitive Science, University of Edinburgh, within the framework of Joint European Project of TEMPUS.

Oct 1991–June 1992 **Heriot-Watt University**, Computer Science

Guest student at Heriot-Watt University, Edinburgh, within the framework of individual TEMPUS scholarship.

1983–1987 **Klement Gottwald XIV Lyceum of Warsaw**

Special Mathematics University Programme. Finalist of Polish National Mathematics Olympics.

RELEVANT WORK EXPERIENCE

Feb 1999–present **Polish Academy of Sciences**, Institute of Computer Science

Research Assistant.

June 1994–Jan 1999 **Polish Academy of Sciences**, Institute of Computer Science

Collaborated with Prof. L. Bolc's Human-Computer Communication Group at the Institute of Computer Science within two grants: "Logiczne podstawy inżynierii lingwistycznej" ("Logical Foundations of Linguistic Engineering"; a Polish Committee for Scientific Research grant) and "An HPSG Treebank for Polish" (a European Union CRIT-2 grant).

Oct 1998–Jan 1999 **University of Tübingen**

Taught a seminar on *Slavic in HPSG*.

Apr 1995–Jan 1996 **University of Stuttgart**, Computational Linguistics

Worked at the Verbmobil machine translation project, Semantic Construction subproject (directed by Prof. H. Kamp).

Feb 1995–Apr 1995 **University of Warsaw**, Computer Science

Taught Prolog (the programming language).

ADMINISTRATIVE EXPERIENCE AND ACADEMIC SERVICE

1999 Co-organized the first Generative Linguistics in Poland workshop, Warsaw, Poland, 13–14 November 1999.

1999 Program Committee member for HPSG'99, Edinburgh, August 1999.

1999 Organized a workshop on Negation in Slavic within the 32nd Poznań Linguistic Meeting, Poznań, Poland, 30 April – 2 May 1999.

1998–1999 Reviewer for CSLI Publications, for the Student Session at ESSLLI-98, and for the Workshop on Current Topics in Constraint-Based Theories of Germanic Syntax at ESSLLI-98.

1997–1999 Maintained WWW pages of the Ph.D. Programme (GK ILS) at the University of Tübingen, Germany. `http://www.sfs.nphil.uni-tuebingen.de/GK/`.

1996–1998 Co-founded and co-edited the *HPSG Gazette*, an electronic newsletter.

May 1997 Organized a workshop on Slavic Languages in HPSG within the 30th Poznań Linguistic Meeting, Poznań, Poland, 1–3 May 1997.

Sep 1996 Edited on-line proceedings of the Tübingen East-West Computational Linguistics Meeting (`http://www.sfs.nphil.uni-tuebingen.de/EastWest/`), Tübingen, Germany, 16–27 September 1996.